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A Rational Account OF THE WEATHER.

Imprimatur,

ROB. SHIPPEN

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A RATIONAL ACCOUNT OF THE WEATHER.

SHEWING

The SIGNS of its several CHANGES and ALTERATIONS, together with the Philosophical REASONS of them.

COLLECTED,

Not only from Common OBSERVATIONS, but chiefly from some of the most Approved AUTHORS, the most Celebrated PHILOSOPHERS, and the most Judicious NATURALISTS of this and former Ages.

The SECOND EDITION *corrected and much enlarg'd.*

To which are added,

Three ESSAYS towards accounting for

I. A continued Course of Wet Years.
II. The Cause of an *Aurora Borealis*.
III. The Cause of the Plague.

Ipse PATER *statuit, quid menstrua* Luna *moneret, Quo Signo caderent* Austri, *&c.* VIRGIL.

By *JOHN POINTER*, M. A. Rector of *Slapton*, in the County of *Northampton*, and Diocese of *Peterborough*.

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THE PREFACE.

AIR (*or the different Temperature of it, by which we mean* WEATHER) *is one of the grand Concerns of Mankind. 'Tis what affects all Sorts of People, Young as well as Old, Sick as well as Strong. Insomuch that even those very Persons that for want of Health are confin'd in close Rooms, feel either the Good or Ill Effects of the* Weather : *The* Air *being like Food, the better, the more refreshing. Hence it is that the Sick Man is inquisitive what* Weather *it will be ; and the Healthful, when he is to take a Journey, is willing to consult his* Weather-Glass. *And even those of the* Fair Sex, *are unwilling to stir abroad unless the* Weather *be like themselves, and they like the* Weather. *How glad wou'd each Man be,*

in his particular State and Condition of Life, either to be enſur'd of Good Weather, *or fore-told of Bad? How glad wou'd the Country-man be, to be aſſur'd of Good* Weather *to ſow or reap his Corn and Hay? How glad wou'd the Traveller be, if he cou'd depend upon the* Weather *for ſuch a determinate Time?*

To this End how frequently have Philoſophers *endeavour'd to make Schemes and Calculations of the* Weather? *And how, even to this Day, do your* Aſtrologers *and Philomaths pretend (tho' in vain) to their* High Flights *of Knowledge in their Prognoſtication of the* Weather, *from I know not what various Motions and* Aſpects, Trines, Squares, Sextiles, Conjunctions *and* Oppoſitions *of the* Planets *with the* Conſtellations, *and with one another, and ſuch like* Aſtrological *Cant and Jargon, which they are Annually troubling the World with, and with which glittering* Starry *Notions they are perpetually dazzling and deceiving the Eyes and Ears of the Unthinking Vulgar, who have neither Opportunities nor Abilities of examining or enquiring into the Reaſons of Things. But how prettily ſoever theſe Men may talk of their* Planets *and* Stars *(for I know no Difference between*

between them as to their Compoſition) and however Solac'd *and* Jovial, Martial *and* Mercurial *they may be at ſome times, yet doubtleſs they muſt take their Turn to be either* Saturnine, Venereal, *or* Lunatic *at other times, if (as they ſay)* Aſtra regunt Homines *(tho' others ſay,* Sapiens dominabitur Aſtris). *But be that as it will,* Semel inſanivimus omnes, *eſpecially when Men have been* Talking out of their Sphere. *However theſe* Sciolifts *may value themſelves upon their* Planetary *or* Starry *Knowledge, yet what Influence can ſuch Diſtant* Orbs *ſhed upon Ours, ſo as to afford us any Rational or even Probable Conjectures in relation to the* Weather ? *If they cou'd, we had long before this Time had certain and infallible Schemes of the* Weather *deliver'd down to us, from the Experience of ſome of the beſt* Aſtronomers, *that have for many Years together, and with the utmoſt Exactneſs, kept their* Diaries, *and made their ſtricteſt Obſervations upon the Conjunctions and Oppoſitions of the* Planets. *Yet, after all, how often has it been obſerv'd, that the very ſame* Aſpect *of the very ſame* Planets *has predicted ſuch a ſort of* Weather *at one Time, and the quite Contrary another ?*

Indeed it must be granted that the Sun *and* Moon *have Influence upon us, by reason of their Proximity; but as to the other* Orbs *(tho' all within the Verge of our* Planetary Syſtem) *they are notwithſtanding in this reſpect Strangers to us, and the* Stars *far greater. And when we gueſs at the enſuing* Weather *from the* Stars, *'tis only becauſe, by getting a clearer or obſcurer Sight of the* Stars, *we thereby diſcover the Clearneſs or Denſity of our Atmoſphere, and ſo accordingly Prognoſticate the Change and Alteration, or Continuance of* Weather.

Therefore I think we need go no farther than this our Sublunary World, *for the moſt probable and rational Conjectures in relation to the* Weather, *and deduce our Prognoſtications from the* Animals *and* Vegetables *of this our* Terrene Globe, *which is compos'd of Land, Water, and Air or Atmoſphere: The Surface of which* Earth *is large enough, being* 199444201 *Miles, and the Solid Content of Air (according to the moſt Modern Calculation)* 2341464949 *Cubic Miles. The Diſtance of the* Moon *from the* Earth 234304 Engliſh *Miles; and the Diſtance of the* Sun *from the* Earth 6485200 *Miles; and the*

Diſtance

Distance of the other Planets, *in this our* Solar System, *proportionably far greater.*

And besides all this, there are several Ingenious Instruments invented, and improv'd, as Barometers, Hygrometers, Thermometers, *&c. by which Men of Ordinary Capacities may pretty easily Prognosticate the Temperature of the* Air, *and consequently the several Changes and Alterations of* Weather. *For Natural Causes do Naturally (*i. e. *according to the settled Order and Nature of things) produce Natural Effects, as a Dry* Air (i. e. *Air free from Vapours) will Naturally produce Fair* Weather; *and Humid* Air, *the Contrary, unless hinder'd by Winds or the like. The same may be said of all other Sorts of* Weather, *in respect of the several Degrees of Heat or Cold, Rarefaction or Condensation.*

But not to insist too much upon Generals, it may not perhaps be thought improper to descend to Particulars, and give a short but Physical Account of the different Phænomena *of the* Weather, *together with the Original of* Clouds, Rain, Hail, Winds, *&c. which may help to give Light to the* Prognostications *of the* Weather, *which I shall give you in the ensuing Discourse. In which Natural*

Account

Account of the ſeveral Sorts of Weather, *I ſhall not altogether adhere to my own Opinion, but give you the Opinions of the moſt celebrated Virtuoſo's, and more eſpecially of that excellent Naturaliſt the Reverend and Ingenious Mr.* DERHAM, *F. R. S. in his* Phyſico-Theology.

And firſt, concerning Clouds and Rain. Clouds and Rain *(ſays he) are made of Vapours rais'd from Water or Moiſture only. (So that he utterly excludes the Notion of Dry, Terrene Exhalations or Fumes; Fumes being really no other than the Humid Parts of Bodies reſpectively Dry). Theſe Vapours are demonſtratively no other than ſmall Bubbles or* Veſiculæ *detach'd from the Waters by the Power of the Solar, or Subterraneous Heat, or Both. And being lighter than the Atmoſphere, are buoy'd up thereby, till they become of an equal Weight therewith, in ſome of its Regions aloft in the Air, or nearer the Earth; in which thoſe Vapours are form'd into* Clouds, Rain, Snow, Hail, Lightning, Dew, Miſts, *and other* Meteors.

In this Formation of Meteors, *the grand Agent is* Cold, *which commonly, if not always, occupies the ſuperior Regions of the Air; as*

is

is manifeſt from thoſe Mountains which exalt their lofty Tops into the Middle and Upper Regions, and are always cover'd with Snow *and* Ice.

This Cold, *if it approaches near the Earth, preſently precipitates the Vapours, either into* Dews; *or if the Vapours more copiouſly aſcend, and ſoon meet the* Cold, *they are then condens'd into* Miſling, *or elſe into Showers of* ſmall Rain, *falling in numerous, thick, ſmall Drops: But if thoſe Vapours are not only Copious, but alſo as Heavy as our Lower Air it ſelf (by means of their Bladders being thick and fuller of Water), in this caſe they become viſible, ſwim but a little Height above the Earth, and make what we call a* Miſt *or* Fog. *But if they are a Degree lighter, ſo as to mount Higher, but not any great Height, as alſo meet not with* Cold *enough to condenſe them, nor* Wind *to diſſipate them, they then form an heavy, thick, dark Sky, laſting for ſeveral Weeks without either* Sun *or* Rain. *And in this caſe, I have ſcarce ever known it to* rain, *till it has been* firſt Fair, *and then* Foul, *be the* Wind *where it will. And from what has been ſaid, the Caſe is eaſily accounted for,* viz. *whilſt the Vapours remain in the ſame State,*

the

the Weather *does ſo too. And ſuch* Weather *is generally attended with moderate* Warmth, *and with little or no* Wind *to diſturb the* Vapours, *and an heavy Atmoſphere to ſupport them, the* Barometer *being commonly High then. But when the* Cold *approaches, and, by condenſing, drives the* Vapours *into* Clouds *or Drops, then is Way made for the* Sunbeams, *till the ſame* Vapours, *being by further Condenſation, form'd into* Rain, *fall in Drops.*

The Cold's *approaching the* Vapours, *and conſequently the Alteration of ſuch* Dark Weather, *I have before-hand perceiv'd by ſome few Drops of* Rain, Hail, *or* Snow, *now and then falling, before any Alteration has been in the* Weather; *which I take to be from the* Cold *meeting ſome of the ſtraggling* Vapours, *or the uppermoſt of them, and condenſing them into Drops, before it arrives unto, and exerts itſelf upon the main Body of* Vapours *below.*

I have (ſays Mr. Derham) *more largely inſiſted upon this Part of the* Weather, *becauſe it gives Light to many other Phænomena of the* Weather. *Particularly we may hence diſcover the Origin of* Clouds, Rain, Hail,

Hail, *and* Snow ; *that they are Vapours carried aloft by the Gravity of the Air, which meeting together ſo as to make a* Fog *above, they thereby form a* Cloud : *If the* Cold *condenſes them into Drops, they then fall in* Rain *if the* Cold *be not intenſe enough to freeze them : But if the* Cold *freezes them in the* Clouds, *or in their Fall thro' the Air, they then become* Hail *or* Snow.

As to Lightning, *and other enkindled Vapours, I only obſerve, That they owe alſo their Riſe to* Vapours ; *but ſuch Vapours as are detach'd from Mineral Juices, or at leaſt that are mingled with them, and are fir'd by Fermentation.*

Another Phænomenon reſolvable from what has been ſaid is, Why a Cold *is always a* Wet *Summer*, viz. *becauſe the* Vapours *riſing plentifully then, are by the* Cold *ſoon collected into Rain.*

We may obſerve farther, That about the Æquinoxes *we have oftentimes more* Rain, *than at other Seaſons. The Reaſon of which is manifeſt, becauſe in Spring, when the Earth and Waters are loos'd from the Brumal Conſtipations, the* Vapours *ariſe in great Plenty : And the like they do in Autumn,*

when the Summer Heats, that both diſſipated them, and warm'd the Superior Regions, are abated; and then the Cold *of the Superior Regions meeting them, condenſes them into* Showers *of* Rain, *more plentiful than at other Seaſons, when either the* Vapours *are fewer, or the* Cold, *that is to condenſe them, is leſs.*

The Manner how Vapours *are precipitated by the* Cold, *or reduc'd into Drops, I conceive to be thus;* Vapours *being no other than inflated* Veſiculæ *of Water, when they meet with a Colder Air than what is contain'd in them, the contain'd Air is reduc'd into a leſſer Space, and the Watery Shell or Caſe, render'd thicker by that means, ſo as to become heavier than the Air, by which they are buoy'd up, and conſequently muſt needs fall down. Alſo many of thoſe thicken'd* Veſiculæ *run into One, and ſo form Drops, greater or ſmaller, according to the Quantity of* Vapours *collected together. Concerning which the Learned and Ingenious Dr.* HALLEY *has given us ſome curious Experiments, in the* Philoſ. Tranſ. *which may be met with together in Mr.* LOWTHORP's Abridg. Vol. II. p. 108, and 126. *Mr.* SEDILEAU *alſo at* Paris *obſerv'd*

ſerv'd it for near three Years : By whoſe Obſervations it appears, that what is rais'd in Vapours, *exceeds that which falls in* Rain. *And by their Obſervations it appears, that in the Winter Months the Evaporations are leaſt; and greateſt in Summer, and moſt of all in* Windy Weather. *Vid.* Mem. de Math. Phyſ. Ann. 1692. p. 25.

If it be demanded, what becomes of the Overplus of Exhalations *that deſcend not in* Rain ? *I anſwer, they are partly tumbled down and ſpent by the* Winds, *and partly deſcend in* Dews, *which amount to a greater Quantity than is commonly imagin'd. Dr.* HALLEY *found the Deſcent of* Vapours *in* Dews, *ſo prodigious at* St. Helena, *that he makes no doubt to attribute the Origin of* Fountains *thereunto. And I my ſelf (ſays Mr.* DERHAM) *have ſeen in a ſtill, cool Evening, large thick* Clouds *hanging without any Motion in the Air, which in two or three Hours time have been melted down by degrees, by the Cold of the Evening, ſo that not any of the leaſt Remains of them have been left.*

Concerning Winds ; Ventus eſt Aer fluens, *according to* SENECA ; *and* Aer agi-

tatus, *according to* ARISTOTLE. *And as* Wind *is a Current of the Air, ſo (ſays Mr.* DERHAM) *that which excites or alters its Currents, may be juſtly ſaid to be the Cauſe of the* Winds. *An Æquipoiſe of the Atmoſphere produces a Calm; but if that Æquipoiſe be more or leſs taken off, a* Stream *of* Air, *or* Wind, *is thereby accordingly produc'd either Stronger or Weaker, Swifter or Slower. And divers things there are that may make ſuch Alterations in the Æquipoiſe or Balance of the Atmoſphere,* viz. *Eruptions of Vapours from Sea or Land; Rarefactions and Condenſations in one Place more than in another; the Falling of* Rain, *Preſſure of the* Clouds, *&c.* HIPPOCRATES *(Lib.* II. *de Vict. Orat.)* Omnes *Ventos* vel à Nive, Glacie, vehementi Gelu, Fluminibus, &c. Spirare neceſſe judicat. BARTHOLIN. *De uſu Nivis,* c. 1.

PLINY (L. II. c. 45.) *tells us of a certain Cavern in* Dalmatia *call'd* Senta, In quem *(ſays he)* dejecto levi pondere, quamvis tranquillo die, turbini ſimilis emicat Procella. *But as to Caves it is obſerv'd, that they often emit* Winds *more or leſs. Dr.* CONNOR *taking notice of this Matter, ſpecifies*

ſpecifies theſe, In Regno *Neapolitano* ex immani *Sybillæ Cumanæ* antro tenuem *Ventum* effluentem percepi. *The like he obſerv'd at the Caves at* Baiæ, *and in ſome of the Mines in* Germany, *and in the large Salt-mines of* Cracow *in* Poland. Ubi *(ſays he)* opifices, & ipſe fodinæ Dominus Andreas Morſtin, nobilis Polonus, mihi aſſeruerunt, quod tanta aliquando *Ventorum* Tempeſtas ex ambagioſis hujus Fodinæ receſſibus ſurgere ſolebat, quod laborantes Foſſores humi proſternebat, nec non Portas & Domicilia (quæ ſibi in *hâc* Fodinâ Artifices extruunt) penitus evertebat. BERN. CONNOR. *Diſſert. Med. Phyſ.* p. 33. Artic. 3.

And as great Caves, ſo great Lakes ſometimes ſend forth Winds. *So* GASSENDUS *ſays the* Lacus Legnius *does*, è quo dum exoritur Fumus, Nubes haud dubiè creanda eſt, quæ ſit brevi in Tempeſtatem ſæviſſimam exoneranda. GASSEND. *Vit. Peireſk.* L. v. p. 417.

But the moſt univerſal and conſtant Alterations of the Balance of the Atmoſphere, are from Heat and Cold. This is manifeſt in the general Trade-Winds, *blowing all the Year between the* Tropicks *from Eaſt to Weſt: If the*

the Cauſe thereof be (as ſome Ingenious Men imagine) the Sun's daily Progreſs round that Part of the Globe, and by his Heat rarefying one Part of the Air; whilſt the cooler and heavier Air behind preſſes after. So the Sea and Land Breezes; and ſo in our Climate, the Northerly *and* Southerly *Winds (commonly eſteem'd the Cauſes of Cold and Warm* Weather) *are really the Effects of the Coldneſs or Warmth of the Atmoſphere. Of which (ſays Mr.* DERHAM) *I have had ſo many Confirmations, that I make no doubt of it. As for Inſtance, it is uncommon to ſee a Warm* Southerly Wind, *ſuddenly chang'd to the North, by the Fall of* Snow *or* Hail; *to ſee the* Wind *in a Cold Froſty Morning* North, *and when the* Sun *has well warm'd the Earth and Air, you may obſerve it to wheel about towards the* Southerly *Quarters; and again to turn* Northerly *or* Eaſterly *in the cold Evening. It is from hence alſo, that in* Thunder-*Showers, the* Wind *and* Clouds *are oftentimes contrary to one another (eſpecially if* Hail *falls), the Sultry Weather below directing the* Wind *one way, and the Cold above, the* Clouds *another way. I took notice (ſays Mr.* DERHAM*) upon* Mar. 10.

$17\frac{10}{11}$,

$17\frac{10}{11}$. *(and divers other ſuch like Inſtances I have had before and ſince) that the Morning was Warm, and what* Wind *ſtir'd, was* Weſt South-Weſt, *but the Clouds were Thick and Black (as generally they are when* Snow *enſues). A little before Noon the* Wind *veer'd about to* North-by-Weſt, *and ſometimes to other Points, the Clouds at the ſame time flying ſome* North-by-Weſt, *ſome* South-Weſt. *About One o'Clock it rain'd a-pace, the Clouds flying ſometimes* North-Eaſt, *then* North, *and at laſt both* Wind *and* Clouds *ſettled* North-by-Weſt : *at which time* Sleet *fell plentifully, and it grew very Cold. From all which I obſerve, Firſt, that tho' our Region below was Warm, the Region of the* Clouds *was Cold, as the black Snowy* Clouds *ſhew'd. Secondly, that the Struggle between the Warmth of Ours, and the Cold of the* Cloudy *Region, ſtop'd the Airy Currents of both Regions. Thirdly, That the Falling of the* Snow *thro' Our Warmer Air melted into* Rain *at firſt, but it became* Sleet *after the Superior Cold had conquer'd the Inferior Warmth. Fourthly, That as that Cold prevail'd by degrees, ſo by degrees it wheel'd about,*

about, both the Winds *and* Clouds, *from the* Northwards *towards the* South.

Mr. ANNELY *(in his* Theory of the Winds) *gives us the Phyſical Cauſes of all* Winds *in General. He reckons that the Aqueous Vapours that are ſuſtain'd by the Air (from whence come Clouds and Rain) may be the Foundation of* Winds. *It is not at all improbable (ſays he) that there is often aſſembled in the Atmoſphere, a ſufficient Quantity of Vapours to maintain a laſting Condenſation, and that it is quick enough at ſome times to create a great* Wind. *For ſome Rains we are accuſtom'd to, are ſufficient to make a ſmall Motion of the Air, were the Vapours to Condenſe no faſter than the abſolv'd Particles diſcharge themſelves by that means; but it ſeems very evident to be much faſter; for when any Part of the Congregated Body of Vapours arrives to a State of Coldneſs fit to Condenſe them, it will be ſuppos'd the Condenſation does quickly ſpread it ſelf throughout the whole Miſty Region —— Theſe Vapours may be retain'd in the Air ſome time after their Condenſation. Which ſeems confirm'd by Obſervation: for we may aſcribe to theſe unprecipitated Atoms of Water which proceed*

from

from Vapours, the Humidity of the Air, and that very Moiſt and Thick Weather that we ſometimes have, when the floating Atoms roving up and down by the Agitation of the Air, alight on our Walls, Floors, Windows, and ſuch like Places; which we find very frequently in the Winter Seaſons, eſpecially in the Night-time; for the extraordinary Cold thereof does in a great meaſure condenſe thoſe Vapours that are rais'd by the Sun *and* Wind *in the preceding Day, which for want of Time, or by the Reſiſtance of the Cold Air, are prevented from riſing High; wherefore we ſee the Glaſs of Windows cover'd by Miſts, at leaſt on the Inſides, for the* Wind *dries the Outſide as faſt as they gather.*

But the Condens'd Vapours are very copious on the Tops of High Hills *and* Mountains, *which extend themſelves to the Clouds, or to the Regions where the Vapours exhal'd from the Earth do chiefly reſide.*

Since therefore we are not to compute the Condenſation of Vapours by any Rain that falls, but may believe they can be condens'd quick enough to cauſe a Wind *of any Intenſity; we are next to enquire, Whether the Earth does not ſupply the Atmoſphere with ſufficient Quan-*

tities of Vapours to account for All the Winds *throughout the World?*

This will not appear a Difficulty, if we attentively consider the Quantities emptied in Rain, Snow, Hail, &c. *and that a great Part of the Aqueous Load of the Atmosphere is never precipitated this way, but spent in a sort of Dew before the Condens'd Mists or Clouds are prepar'd for Rain, or any other Precipitation, which is receiv'd in so great measure by High Land and Ridges, that Dr.* HALLEY *ascribes it to the Rise of Springs, of great Currents, the Repletion of Seas,* &c.

By the Estimation Dr. HALLEY *has given us of the Vapours rais'd by the Heat of the Sun, we shall find an immense Quantity is constantly remitted from the Earth to the Atmosphere. No less than* 129,796,219 *Cubical Miles of the Atmosphere are fill'd by Vapours every Day.*

This prodigious Quantity being divided and aranged in Bodies at various Stations throughout the World, occasions, by the mutual Condensations, almost constant Results of the Air to supply the empty Places; and I believe it will be thought abundantly sufficient for producing

and

and maintaining all Winds *universally, especially if we consider with Dr.* HALLEY, *what unknown Quantities of Vapours are rais'd by the* Winds, *and likewise, that the great and variable* Winds *do not extend all over the World.*

Thus far have we treated of what relates to the Condensation of Vapours; but it will be suppos'd that upon the same Hypothesis, their Accession to the Atmosphere will also cause a Motion therein, by driving the Air from the Place they occupy. Herein are we to observe, that Evaporations of the Earth are unbounded throughout the Hemisphere next the Sun, and what Vapours occur to any one Place, do every where resist the Incursion of the ampulated Air from the neighbouring Place; and tho' the Earth does more profusely emit its Vapours where it is in the Vertical Heat of the Sun; yet the Air by the greater Heat there, is more rarify'd, whereby it makes room for admitting a greater Quantity of Vapours; and so if we proceed from the Zenith *to the* Horizon, *we shall find, that as the Emission of Vapours decreases according to the Heat of the* Sun, *it supplies the Rarifaction which decreases in the same manner. Thus the Air of that Side*

of the Earth towards the Sun, *is oppos'd from flowing in on the contrary Hemisphere, by the augmented Resistance the latter receives by being condens'd by the Cold of the Sun's Absence.*

But considering how great the Expansion of Vapours is, and that they are emitted incessantly, we may believe they do more than balance the Rarifaction made by the Sun's *Heat, and swelling the Atmosphere occasions a Motion to the attenuated Parts, and has frequent Recourses to Land, which produces less Vapours; whence 'tis likely those Breezes come that we call* Sea *and* Land Breezes.

Thus we see the Production of Winds *depends chiefly on the Condensation of Vapours. Which Opinion agrees exactly with that of* ARISTOTLE's, Rarefactio Aeris est Causa Ventorum.

To this Opinion of Mr. ANNELY's *of the* Winds, *I shall add that of Mr.* SAUL's, *in his excellent Account of the Barometer*, p. 82. *The* Temperate Zones *(says he) being by their Situation liable to different Degrees and frequent Vicissitudes of Heat and Cold, are by Experience found to be the chief and only Seat of the variable* Winds: *Whereas in the* Torrid and Frigid Zones, *the Degrees of*

Heat

Heat and Cold being more equal, conſtant and regular, the Winds *blowing within their reſpective Limits are ſo too.*

By the daily Revolution of the Earth upon its own Axis, the Air within the Tropicks *paſſing daily under the Meridian Heat of the* Sun, *is to a great Degree rarify'd and attenuated by it: In the Conſequence of which, the more Cool and Heavy Air preſſing in to preſerve the Balance; and following the apparent Motion of the* Sun *towards the* Weſt, *cauſes a general* Eaſt-Wind *to blow round the Globe on each Side of the* Æquator; *which being at all Seaſons of the Year nearly equal and conſtant, can produce little Alteration in the Weight of the Air.*

The very ſame Effect equally follows from the intenſe and ſettled Coldneſs of the Polar *Regions, whereby the Air above is to ſuch a Degree condens'd and continued in a State of Denſity, as even to reſiſt the Impreſſion of the* Winds. *And agreeably to this Purpoſe Mr.* BOYLE *(from the Voyages to* Greenland, *&c.) remarks, That when any of the Mountains of Ice in thoſe* Northern *Climates are looſen'd from their Foundations, and ſail with the Current from the* Polar *Regions toward the* Tropick,

Tropick, *they are generally follow'd with a ſtrong* North *or* Eaſterly Wind, *driving them forward; and as ſome of theſe Mountains are deſcrib'd by Travellers, as riſing in Height and ſinking in Depth from* 50 *to* 140 *Fathoms, and extending in Bulk and Circumference ſeveral Miles: it is certain that ſuch a prodigious Accretion of Snow and Ice (advancing ſtill with its broad Baſis out of the Ocean, in proportion as the Upper Parts melt and diſſolve) muſt be attended with very great and ſenſible Effects upon the Air and Vapours of Warmer Climates; and often cauſe thoſe unſeaſonable Bleak* Winds, *and Storms of Hail in the Summer-Months, which ſome Philoſophers have with Reaſon aſcrib'd to them.*

I ſhall conclude this Preface with a Caution to my Readers; and that is, not to look upon theſe Signs *and* Indications *of Good or Bad* Weather *(which I am going to give 'em) as always ſure and certain, but only as, for the moſt part, probable and conjectural. For tho' when moſt Animals are more or leſs Heavy and Dull, the Air is ſo too, as being clogg'd with Vapours, that are a hindrance to Perſpiration; yet we find that Rain does not always*

always (tho' it does often) follow: Nay, tho' when we plainly see that the Air is Humid and Moist, and several Solid Bodies Humid and Moist at the same time, and that these are almost infallible Signs of Wet Weather, yet Rain is not always the Consequence of them. So on the contrary, when the Air is clear and serene, and most Animals more or less Brisk and Airy, the Clear Air invigorating their Blood and refreshing their Spirits, yet a Fair Season is not always a Natural Consequence of all this, tho' it wou'd be so, unless hinder'd by other Causes. The Reason of all which, is the Uncertainty of the General State and Quality of the Atmosphere. And (as Mr. SAUL *well observes in his excellent Account of the Barometer,* p. 74.) *no Regular or Certain Judgment can be form'd of the General State and Quality of the Atmosphere, without taking in the full Extent of it; because the Upper Regions of the* Air *may be very different from the Lower in their Effects and Indications; nor can any Change of the* Weather *be lasting, where there is not a suitable Tendency in the whole* Atmosphere *to support and confirm it.*

And

And upon this Account, the Weight of the whole Atmoſphere *runs thro' the whole Extent of it; and is in truth, the chief Property concern'd, as well in ſupporting the Clouds and Vapours, as in giving way, upon any Abatement, to their Deſcent in Rain.*

If therefore we ſuppoſe (as it ſometimes happens) the Lower Region of the Air *to be Humid, when all Above has a Tendency to be Fair and Dry; or the Lower Region to be Dry when all Above has a Tendency to Wet Weather: It is certain, that no Conjecture, taken from Part of the* Atmoſphere, *can be ſo well grounded, as what is deriv'd from the more general and prevailing Quality of the Whole.*

Not that even in this latter Caſe we can form any certain Judgment of a Thing ſo mutable as the ſucceeding State of the Weather: *Becauſe the ſudden Changes and Oppoſitions of the* Winds, *and Confuſions in the Streams of the* Air, *and Vapours driving Above, are uſually attended with Changes equally ſudden and irregular in the Temper and Quality of the* Air.

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A

RATIONAL ACCOUNT

OF THE

WEATHER, &c.

Signs of Rainy *Weather from Animals. First from* BIRDS.

CREATURES that live in the Open Air, muſt needs be ſuppos'd to have quicker Senſe of it, than Men that live more within Doors, eſpecially BIRDS that live in the Air that is Pureſt and Cleareſt, and are apter by their Voices, and Flights, and other Motions, to diſcover their Senſations of it. Therefore thoſe that have apply'd themſelves to the Obſervation of the Signs and Prognoſtications of Good or Bad *Weather*, have laid down theſe following Rules:

Water-Fowls (ſays that excellent Naturaliſt my Lord BACON, in his *Nat. Hiſt.* Cent. 9.) ſuch as *Sea-Gulls*, *Moor-Hens*, &c. when they flock and fly together from the Sea towards the Shoars, foretel *Rain* and *Wind.* Thus VIRGIL (in his *Georgics*, l. i.) enumerating the Signs of *Rain*,

Cum medio celeres revolant ex Æquore *Mergi*,
Clamoremq; ferunt ad Littora; cumq; Marinæ
In ſicco ludunt *Fulicæ*; notaſq; Paludes
Deſeruit, atq; altum ſupra volat *Ardea* nubem.
i. e.
When crying Cormorants *forſake the Sea*,
And ſtretching to the Covert wing their Way;
When ſportful Coots *run ſkimming o'er the Strand, &c.*

And contrariwiſe, *Land-Birds*, as *Crows*, *Swallows*, &c. when they fly from the Land to the Waters, and beat the Waters with their Wings, do likewiſe foretel *Rain* and *Wind.* Thus PLINY (in his *Nat. Hiſt.* lib. xviii. c. 79.)

Si *Corvi* carptim vocem reſorbebunt, Ventoſum Imbrem præſagiunt... Et cum *Terreſtres Volucres* contra Aquam clangores dabunt, perfundentes ſeſe, ſed maximè *Cornix*. i. e.

When Crows *are clamorous they foretel a* Storm: *And other Land-Fowl will be vociferous againſt* Rain, *and beſprinkle themſelves, but eſpecially the* Rook.

And thus LUCAN, l. v. ver. 555.

Quodq; caput ſpargens undis, velut occupet Imbrem.
Inſtabili greſſu metitur littora *Cornix*:
i. e. *The*

i. e.

The Rook *ſprinkles her Head with Water, as tho' ſhe was actually enjoying the Shower, and walks about the Shoar in a reſtleſs Expectation of approaching* Rain.

The Natural Reaſon of all which is the Pleaſure, that both theſe Sorts of Birds take in the Humidity and Denſity of the Air, and ſo love to be in Motion and upon the Wing. For it is no wonder that *Water-Fowl* do delight moſt in that Air that is moſt like (their Natural Element) Water: And *Land-Fowl* alſo (many of them) take Pleaſure in Bathing and Humid Air. For the ſame Reaſon likewiſe many *Birds* do prune their Feathers, and *Crows* do ſeem to call upon Rain, and *Geeſe* do gaggle: *Anſeres* (ſays PLINY) *continuo clamore intempeſtivi*; i. e. *Geeſe* are inceſſantly gaggling and overjoy'd at the approaching *Rain:* All which is the Pleaſure theſe *Birds* ſeem to take in the Relaxation of the Air. Vid. THEOPHRAST. *lib. de Signis Temp.* p. 124.

The *Heron*, being a *Water-Fowl* *, takes Pleaſure in the Air that is condens'd;

* *I call it a* Water-Fowl *becauſe it lives near the Water to catch Fiſh, tho' it does not ſwim in the Water; as the* Halcyon *or King-Fiſh, is call'd a Sea-Bird, becauſe it builds its Neſt upon the Shoar.*

and beſides, being but heavy of Wing, needs the Help of the groſſer Air, and for this Reaſon flies low when the Air is full of Vapours, and thickens into Showers. Thus LUCAN, lib. v. ver. 553.

——Quodq; auſa volare
Ardea Sublimis pennæ confiſa natanti.

i. e.

When watchful Herons *leave their watry Stand,*
And mounting upward, with erected Flight,
Gain on the Skies, and ſoar above the Sight.

The *Crows* alſo flocking together in large Flights, holding their Heads upward as they fly, and crying louder than uſual, is a Sign of *Rain*; as is likewiſe their ſtalking by Rivers and Ponds, and ſprinkling themſelves. Thus VIRGIL;

—— Et è paſtu decedens agmine magno
Corvorum increpuit denſis Exercitus alis.
Jam varias Pelagi *Volucres*, & quæ *Aſia* circum
Dulcibus in Stagnis rimantur prata *Caiſtri*,
Certatim largos humeris infundere rores;
Nunc caput objectare Fretis, nunc currere in Undas,
Et ſtudio incaſſum videas geſtire lavandi.
Tum *Cornix* plena *pluviam* vocat improba voce,
Et ſola in ſiccâ ſecum ſpatiatur Arenâ.

i. e.

Huge Flocks of riſing Rooks *forſake their Food,*
And, crying, ſeek the Shelter of the Wood.
Beſides the ſev'ral Sorts of Watry-Fowls,
That ſwim the Seas, or haunt the ſtanding Pools;

The

The Swans *that ſail along to ſearch their Food,*
Then lave their Backs with ſprinkling Dews in vain,
And ſtem the Stream to meet the promis'd Rain.
The Crow *with clam'rous Cries the Show'r demands,*
And ſingle ſtalks along the Deſart Sands.

Thus likewiſe ARATUS:

Agmine cum denſo circumvolitare videtur
Gracculus, & tenui cum ſtridunt gutture *Corvi*,
Convenit inſtantes prænoſcere protinus *Imbres*.

i. e.

When Jack-Daws *are obſerv'd to flock together in large Flights, and* Crows *caw more eagerly, 'tis a Sign of approaching* Rain.

Alſo the Chattering of *Swallows*, and the flying low about Lakes and Ponds (which they do to catch flies, for the Air being clogg'd with Vapours, hinders the Aſcent of Flies) denotes *Rain*. Thus VIRGIL;

Aut arguta Lacus circumvolitavit *Hirundo*.

i. e.

The Swallow *ſkims the River's watry Face.*

And hence PLINY, who had theſe Hints from VIRGIL;

Hirundo tam juxta Aquam volitans, ut pennâ ſæpè percutiat. i. e.

The Swallow *flies ſo cloſe upon the Superficies of the Water, that he often ſtrikes it with his Wing.* See THEOPHRAST. *lib. de Signis Tempeſt.* p. 111.

Other Signs of *Rainy* Weather from *Birds* are, when *Peacocks* cry much: When

When *Fowls* pick up their Feathers with their Bills: When *Birds* that uſually perch upon Trees, fly to their Neſts; *Quæq; in Arboribus habitant, fugitantes in Nidis ſuis*, ſays PLINY: And when *Pigeons* return to their Dove-houſe: When *Cocks* crow before their uſual Hour; and *Hens* creep in Cluſters into the Duſt; and *Owls* are clamorous; *Noctua in imbre garrula*, ſays PLINY.

Signs of Rain from Beaſts.

THERE are ſeveral Sorts of BEASTS likewiſe that foretel *Rain*. When *Sheep* leap mightily, and friſk about, and puſh at one another with their Heads: *Pecora exultantia, & indecora laſcivia ludentia*, ſays PLINY.

When *Deer* fight: When *Aſſes* bray, or ſhake their Ears, and are much annoy'd with Flies: When *Foxes* bark, and *Wolves* howl mightily: So VIRGIL;

——————— Et altè
Per noctem reſonare, *Lupis* ululantibus, Urbes.

When *Hogs* at Play break and ſcatter their Food——*Turpes* Porci *alienos ſibi manipulos lacerantes*— ſays PLINY.

When

When *Cattle* leave off Feeding, and haſten to ſhelter under Hedges and Buſhes, *&c.*

When *Cats* rub their Heads with their Fore-Paws (eſpecially that Part of their Heads above their Ears) and lick their Bodies with their Tongues. The Reaſon of which is the Humidity of the Air incommoding their Bodies by clogging their Hair and obſtructing their Pores. The very ſame Reaſon may be given for *Aſſes* braying, *Foxes* barking, and *Wolves* howling, *&c.*

Beaſts do generally take Delight in a Wet Air, and it makes them eat their Meat the better: Becauſe the Humidity of the Air helps to relax the Fibres of the Stomach, and open the Glandules which tranſmit an Acid Juice that creates an Appetite. Hence it is that *Sheep* will raiſe themſelves betimes in the Morning to feed againſt *Rain*; and *Cattle*, and *Deer*, and *Rabbets* will feed hard before Rain: Only *Heifers* and *Oxen* will put up their Noſes and ſnuff in the Air againſt Rain. Thus VIRGIL;

——————— *Bucula* Cœlum
Suſpiciens patulis captavit naribus Auras.

i.e. *The*

i. e.

The Cow *looks up, and from afar can find*
The Change of Heav'n, and ſnuffs it in the Wind.

And hence PLINY;

Et *Boves* Cœlum olfactantes, ſeq; lambentes contra Pilum. i. e.

Oxen *are ſenſible of the Alteration of the Weather, and are ever and anon ſnuffing and toſſing up their Noſes, and licking themſelves againſt their Hair: Which they do to eaſe themſelves by opening the Pores of their Skin, which before were* clos'd by the Humidity of the Air.

Signs of Rain from Fiſhes.

FISHES in the Sea, or in Rivers, do often predict *Rain*, by their playing towards the Top of the Water. The Reaſon of which is this (ſays my Lord BACON) *Fiſhes* love to keep from the Air as much as they can when it is Dry, and ſwim lower, and will not approach the Air till it is Moiſt. Tho' I rather think 'tis for want of a ſufficient Quantity of Internal Air in the Water, that the *Fiſhes* are forc'd to leap up now and then upon the Superficies of the Water to recruit themſelves with a little freſh Air; becauſe the External Air being clogg'd with Vapours, is too weak to penetrate the Waters. For as *Fiſhes* cannot live by Water alone, but require a due Mixture of

of Water and Air; so neither can they live by Air alone, as is plain from *Fishes* soon dying when taken out of the Water, being then out of their Element. And that they cannot live without Air is evident from their dying in Rivers and Ponds when frozen up.

Now to give the Natural Reason for this, I cannot do it better than in the Words of the Ingenious Dr. CHAR. PRESTON (*Phil. Transf.* N° 225. p. 419.) *Fish* (says he) are remarkably different from all other Animals in many Particulars. The most considerable Difference is in their want of *Lungs*, and their not *Breathing*; and yet it is necessary that something should supply this in *Fishes*, which may have the same Effect upon their Blood, as the *Air* has upon Ours, by entring into our *Lungs*, that is to say, to Divide and Dissolve it, and render it fit for Circulation. Now we find no Part in *Fish* more proper to produce this Effect than the *Bronchiæ* that lie like so many Leaves upon each other under their *Gills*; for they receive the *Water* in by the Mouth, and return it by the Gills, or receiving it in by the *Gills*, they

throw it out by the *Mouth*. Hence it is agreed upon by all that the *Water* contains ſomething that produces this Effect, and this ſeems moſt probably to be *Air*.

That there is Air in all *Water* cannot be doubted after this Experiment of M. MAROLLE. He ſet a Veſſel of *Water* over the *Fire*, ſo to drive out the *Water* from it. This *Water* he put into the *Air-Pump* to draw out the *Air* from it; and after that fill'd a Vial with it, within two or three Fingers of the Top, which Space he only left full of *Air*, and ſtopt the Vial well; and by ſhaking it the *Water* imbib'd the *Air*, ſo as to raiſe up and quite fill the Vial.

But we need not wonder that *Fiſh* cannot alſo live in the Open Air. Their Blood is Naturally leſs Hot than Ours, ſo that the Natural Heat of Ours wou'd be a Fever in them, and Mortal: For the *Nitre* of the pure *Air* is in too great a Quantity, and too ſubtile, ſo that it Diſſolves their Blood too much, and makes it too *Fluid*; whereas the *Nitre* in the *Water* is more Groſs and in leſſer Proportion; whence it gives their Blood only a *Fluidity* requiſite to keep it in

in its *Natural State*. To prove that it is in the *Bronchiæ* that this Division is perform'd, we need but observe their Extraordinary Redness above any other Part of the Body; a Proof that the Blood is there more Divided. *Fish* are also found to die in *Water* frozen over, which happens plainly from their Communication with the *Outward Air* being hindred by the *Ice*.

Signs of Rain from Insects.

INSECTS also and *Reptiles* foretel Rain. *Vermes terreni erumpentes* — says PLINY: *Earth-worms* will creep out of the Ground; and *Moles* will cast up more Earth; and *Fleas* bite more against Rain; and *Spiders* creep abroad; and *Flies* are very troublesome, often dashing against a Man's Face. *Bees* do not stir (or at least not far) from their Hives. *Ants* quit their Labour, and hide themselves in the Ground: For these Provident *Insects*, by a secret Instinct of Nature, find the Air chang'd into Moistness, and clogg'd with Vapours, carry their Eggs to a Place of drier Security.

Thus VIRGIL;

Sæpius & tectis penetralibus extulit Ova
Angustum *Formica* terens iter——

i. e.

The careful Ant *her secret Cell forsakes,*
And drags her Eggs along the narrow Tracts.

Hence PLINY;

Segnitèr & contra industriam suam absconditæ *Formicæ*, vel concursantes, aut Ova progerentes.

i. e.

Frogs *will croak in Ditches more than usually against Rain, and* Toads *are heard to croak upon Eminences.*

Thus VIRGIL;

Et veterem in limo *Ranæ* cecinere querelam.

i. e.

The Frogs renew the Croaks of their loquacious Race.

And ARATUS,

Si repetent veterem *Ranæ* per stagna querelam.

Hornets likewise and *Wasps* are Foretellers of the Weather. If they are seen flying together in greater Numbers than ordinary in an Evening, they foretel *Warm* and *Fair Weather* the next Day: But if in a dark and dull Day they are observ'd to betake themselves to their Nests more frequently for Shelter, you may then expect either *Rain*, *Wind*, or *Storms* the next Day. So MOUFET tells us (in his *Insectorum Theatrum*, p. 52.) His Words are,

——*Cra-*

— *Crabones* rusticis *Tempestates* etiam prædicunt; nam si Vesperi numerosiores circumvolitent quàm solebant, signum est *Caloris* & *Serenitatis* futuræ proximo die. Si verò luce creperâ sæpiùs intraverint Nidos, quasi sese occultaturi, *Pluviam*, Ventos, vel tempora *Procellosa*, exspecta.

Undè AVIENUS,

Sic & *Crabonum* rauca Agmina si volitare
Fine sub Autumni conspexeris, æthere longo,
Jam Vespertinos primos cum commovet Ortus
Vigiliis, pelago dices instare *Procellum*.

Gnats likewise foretel the Weather. For if they play up and down the open Air near the Sun-set (says MOUFET) they presage Heat: If in the Shade, warm and mild *Showers*: But if they all of them together sting those that pass by them, then expect *Cold* Weather and very much *Rain*. His Words are,

Si Κνῖπες (i. e. *Culices*) divergente Sole colluserint in aprico, *Calores* præsagiunt: Si in Umbrâ, *Pluvias* tepidas & mites: Si verò unà acriter præteriuntes pepugerint, frigidam *Tempestatem* & valdè *Pluviosam* exspecta.

Now the best Natural Reason (in my Opinion) that can be given why these Little Animals call'd Insects, come to have such quick and exquisite Sense of things, is because their Organs of Sensation are smaller. That excellent *French* Author

VERDUC,

VERDUC, in his Treatise of the Parts of *Human Body*, pag. 244. gives us a very Curious Account of the Sensations of *Bees*. *Bees* (says he) perceive the Smells of Flowers at a great Distance; but to understand how they perceive it, there's the Difficulty. Mr. PERRAULT in his *Mechanism of Animals* (which is the most curious Treatise of all his Physical Essays) says that Bees, common Flies, and many other Insects, which have not only the Use of Smelling, but also Seeing and Hearing, yet have nothing but one Universal Sense, which is a very delicate Touch; for it being impossible that all the Objects of the different Senses should be known, without some particular Motion which may render them sensible, methinks (says this Learned Naturalist) that those Insects which are very small, must needs have those Particles which form the Organ of their Senses much smaller, whence the Organ is more easily shaken by the Motion of the Objects, let it be never so gentle or slight, and much otherwise than in Great Animals, where the Organ of Touching cannot be shaken without some considerable Motions.

The

The Ancients, who tried many Experiments, and made many Observations on *Bees*, and every thing that belongs to them, could never believe that they heard the Sound of the Brass, tho' they follow'd it; even ARISTOTLE himself is of this Opinion. Supposing then that the *Insects* have a very fine delicate *Touch*, perhaps that may be equivalent to the Organ of Hearing in other Animals, that is to say, that the Shaking of the Air, which is not perceiv'd by the *Touch* of Great Animals, is proportion'd to that of *Insects*; so that to explain what appears to us of the Sense of these small Creatures, we may say that if the Exhalation or Vapour which arises from a Dead Beast, or from Honey or Sugar in a Box, is capable of touching a Fly or an Ant at so great a Distance; it is also the Vapour which comes from the Hand which draws the Fly thither.

From whence I conclude that the Coldness and Moisture of the Air affects these little Insects in such a manner as to admonish them to retire into Shelter; and by this means they predict *Rain*.

Signs of Rain from MEN.

EVEN in MEN, Aches, Wounds, and Corns are more troubleſome, either towards *Rain*, or towards *Froſt*: For the one makes the Humours of the Body to abound more, and the other makes them ſharper: Both of which Extremes bring the Gout. The very Body of all *Animals* and *Vegetables*, is (as it were) a Contexture of Hygrometers, Barometers, and Thermometers; for the Humours, with which the organiz'd Bodies are repleniſh'd, increaſe or decreaſe according to the different Diſpoſitions of the Air.

A late ingenious Author (Mr. HANDLEY in his *Mechanical Eſſays* on the Animal Œconomy, p. 454, *&c.*) ſays, All the Changes that happen, either by Heat or Cold, to fermenting Liquors, are caus'd by the Alteration of either the Gravity or Spring of the Air; and it is for the ſame Reaſon that ſome People by their *Pains* and *Aches* are ſo often Weather-wiſe: Their Blood being more rarify'd againſt *Wet* Weather or High *Winds*, will more forcibly preſs the ſenſible Membranes, whereby *Pains* will be felt which they felt not before.

If

If the Air be too Hot, especially if Moist withal, it disposes the Body to Malignant Fevers; and if the Heat be excessive (tho' without Moisture) it produces Diary Fevers; and what the Ancients call'd *Putrid.* Perspiration being too great, the Humours must remain Viscid and Dry, and so unfit for Circulation.

The Air being fill'd with Vapours, its Elasticity is weaken'd, the Fibres of the Body are relax'd, and the Pores obstructed; which will make the Blood apt to dispose a slimy *Lentor* on the Sides of Capillary Arteries, and Orifices of the Glands, which will be apt to produce Agues; and more especially if Cold be added to the Moisture of the Air; for Cold binds up and makes the Blood more compact, whereby its Motion becomes slower, and its Viscidity greater, and so produces this Distemper.

Signs of Rain from Solid Bodies.

STONES (especially *Marble*) when they sweat (or rather seem to sweat) and *Boxes* and *Doors* (especially *Deal*) and *Pegs* of *Wood,* when they draw and

wind hard, are Signs of *Wet* Weather. Tho' the former be but from an Outward Cauſe, for that the *Stones* are ſo hard and ſolid as not to admit the Moiſture of the Air, and therefore it only lies upon the Superficies of the *Stones*; the latter is an Inward Swelling of the Body of the *Wood* it ſelf, caus'd by the Admiſſion of the Air thro' its Pores. For the Air preſſing upon the Aqueous Particles floating in it, forces them into the ſlender Tubes of the *Wood*, where they meet with no Reſiſtance, the Particles of Air being too large to enter the ſame; from whence it appears that the Component Particles of Water, are leſs than thoſe of Air.

M. *Ozanam* ſays the moiſt Vapours do readily inſinuate into *Wood*, eſpecially that which is light and dry, as being extremely Porous; inſomuch that they are ſometimes made uſe of for dilating and breaking the hardeſt Bodies, particularly Mill-ſtones; for when a Rock is cut into a Cylinder, they divide that into ſeveral leſſer Cylinders, by making ſeveral Holes round the great Cylinder, at Diſtances proportional to the deſign'd Thickneſs of the Mill-

ſtones;

ſtones; and filling them with as many Pieces of *Sallow Wood* dried in an Oven; for when *Wet* Weather comes, theſe *Wedges* or Pieces of *Wood* are ſo impregnated with the moiſt *Corpuſcula* of the Air, that they ſwell and break or ſeparate the Cylindrical Rock into ſeveral Mill-ſtones.

The hardeſt and moſt ſolid *Wood* will ſwell by the Moiſture of the Air; as appears by the Difficulty of ſhutting our Doors and Windows in *Wet* Weather.

The Humidity of the Air inſinuates it ſelf not only into the *Wood*, but likewiſe into the *Hardeſt Bodies* which are not deſtitute of Pores, and eſpecially into the Light Bodies which take up a great Space. And hence it is, that Mr. PASCHAL (in his Treatiſe of the *Æquilibrium of Liquors*) ſays, that if a Pair of Scales continues in *Æquilibrio* when loaded with two equal Weights, one of which is of a more Voluminous Subſtance than the other, as *Cotton* or any Body of a leſſer Specific Gravity, the Balance will depart from its *Æquilibrium*, and incline to that more Voluminous Weight when the Air

is condens'd with Vapours: For the Watry Particles, with which the Air is loaded, will insinuate themselves more readily into this, than into the other Weight, which being less Voluminous, must needs have lesser Pores.

But of all the Bodies that are apt to imbibe the Moisture of the Air, I know of none more such than the *Salt* of any Hot Plant, or *Salt-petre* well calcin'd, which, upon the least Moisture of the Air, melts readily into Water, so as to weigh three or four times as much as before. For this is the Common Quality of almost all *Salts*, that they are easily impregnated with the Bodies contain'd in the Air; and accordingly when the *Salt* at a Table is moister than ordinary, we take it for a certain Sign of approaching *Rain*, as denoting that the Air is loaded with Moist Vapours, which will quickly dissolve into *Rain*.

Signs of Rain from Lakes.

AT *Penford* in *Staffordshire* is a Lake that foretels *Rain*. Tho' it be a standing Lake, yet it is seldom dry, and toler-

tolerably clear in ſettled fair Weather; only againſt *Rain* it becomes troubled, riſing full of Bubbles, and in a little Time thickening at the Top into a *yellow Scum*, which preſently as it rains vaniſhes away, and the Water recovers again its former Colour and Clearneſs. All which has frequently been obſerv'd and found to be true by the Worthy Mr. FOWLER, an Inhabitant of the Place, who freely confeſs'd that he had often been admoniſh'd by it in Time of Harveſt to fetch in his Corn, and at other Times made the ſame Uſe of it as we do of *Weather-glaſſes* or other *Hygroſcopes*. The yellow Scum on the Superficies of the Water can be nothing elſe, in my Opinion, than Sulphureous Vapours, whoſe Aſcent being hinder'd by the Preſſure of the Watry Atmoſphere at thoſe Times, cauſes that Ebullition and Fermentation on the Top of the Water, which afterwards thickens into that yellow Scum. For the Water of all Lakes is more or leſs impregnated with a crude Sulphur, occaſion'd by its Stagnation, which muſt needs emit contagious Vapours, inſomuch that ſometimes Birds have been ſuffocated by them in endeavouring to fly over them.

Signs

Signs of Wet or Fair Weather from the Diſpoſition of the Atmoſphere.

THE Reverend and Ingenious Mr. SAUL (in his Hiſt. and Philoſ. Account of the *Barometer*) ſays, So long as the Air continues Heavy (being either condens'd or accumulated in Quantity) the Vapours will be ſuſtain'd, and the Weather hold *Fair:* But if the Air by any Rarification or Diminution of its Quantity turns lighter, Vapours, which were before in *Æquilibrio* with it, will preponderate; and being heavier than the Air, in which they floated, will conſequently deſcend. In their Deſcent, as they approach nearer to each other, and are continually check'd by the Reſiſtance of the Air, they muſt be condens'd; and this Condenſation of the falling Vapours will gradually encreaſe, till they are compreſs'd and collected into ſmall Particles or *Globuli* of Water; and theſe again, incorporating with others in their farther Deſcent, are at laſt form'd into bigger Drops, and fall down in Showers of *Rain*; and theſe Showers will be more

or

or leſs violent, and the Drops larger or ſmaller, in proportion to the Quantity of the falling Vapours, and the Height from whence they deſcend. See the Beginning of this Book.

Signs of Rain from the Planets and Stars: Firſt from the SUN.

IF the SUN at his Riſing looks Red, and Broader than uſual, then many Moiſt Vapours are gathering from the Sea, the Air is thickning, and the *Sun-beams* diffus'd in it, makes the Face of that Planet ſhow greater than uſual, and in a little Time you'll ſee the Clouds muſter and ſpread the Face of the Heavens, and the Air condenſing into a Watry Body: And if this happen in Hot Weather (*viz.* Summer or Autumn) violent *Showers* of *Rain* will fall, but not of long Continuance; but if in Winter or Spring, ſettled *Rains*, but more moderate. Thus VIRGIL, *Georg. Lib.* i.

SOL quoque & Exoriens, & cum ſe condit in Undas,
Signa dabit: SOLEM certiſſima Signa ſequuntur,
Et quæ Mane refert, & quæ Surgentibus ASTRIS,
Ille ubi Naſcentem maculis variaverit Ortum

Concavus

Concavus in Nubem, medioque refugerit Orbe;
Suſpecti tibi ſint *Imbres.* Namque urguet ab Alto
Arboribuſque ſatiſque Notus Pecorique ſiniſter.

i. e.

Above the reſt, the Sun, *who never lies,*
Foretels the Change of Weather in the Skies:
For if he Riſe, unwilling to his Race,
Clouds on his Brow, and Spots upon his Face;
Or, if thro' Miſts he ſhoots his ſullen Beams,
Frugal of Light, in looſe and ſtraggling Streams,
Suſpect a driſling *Day, with ſouthern* Rain,
Fatal to Fruits, and Flocks, and promis'd Grain.

Pliny, *Nat. Hiſt.* L. xviii. c. 35.

Sol concavus Oriens *Pluvias* prædicit; idem *Ventos*, cum antè Exorientem eum Nubes rubeſcunt. Quod ſi & nigræ rubentibus intervenerint, & *Pluvias.* Cum Orientis & Occidentis radii rubent, coire *Pluvias.*

i. e.

When the Sun *riſes hollow (that is ſomewhat obſcur'd by Clouds, or hid in the Cavity of a Cloud) it foretels* Rain. *When the Clouds look Reddiſh before the Sun-riſing, it foretels* Wind: *But if there be a Mixture of Black Clouds with the Red, it foretels* Rain. *When the Rays of the* Sun *look Red, either at its Riſing or Setting, it is a Sign of* Rain.

It has likewiſe been obſerv'd by thoſe that have had long Experience of the Weather, That if the Sun Riſes with a Blewiſh Circle inclining to White, the Air is groſs and condens'd, and *Rain* will ſoon follow.

Or

Or if the SUN riſes Pale, and the Sky of a Dusk-Red in the Morning, an Overcaſting will ſoon enſue, and *Rain* quickly follow upon it, attended with whiſtling Winds. Thus PLINY;

Si in Exortu SOLIS fiet ita ut rubeſcant Nubes, maxima oſtendetur *Tempeſtas*. Si non ambibent, ſed incumbent, à quocunque Vento fuerint, eam portendent; i. e.

If the Clouds look Red at Sun-riſe, there will be a very great Tempeſt. *And they hang and not move about (from whatever Quarter they come) they portend the ſame.*

Again, if the SUN riſes in a miſty, muddy Colour, and diffuſes its Rays Paliſh towards the North and South, it denotes *Rain*. So PLINY;

Si in Exortu SOLIS ſpargentur Nubes partim ad *Auſtrum*, partim ad *Aquilonem*, pura circa eum Serenitas ſit licet, *Pluviam* tamen *Ventoſque* ſignificabunt. i. e.

If at SUN-*Riſing, the Clouds are diſpers'd* Northward *and* Southward, *tho' the* SUN *ſhines never ſo clear, there will be* Rain *and* Wind.

Ita FESTUS AVIENUS *De Sole*, p. 69.

Sed non ora Cavo ſimilis, medioque recedens
Ore quaſi, vel ſi radios diſcingitur ultro
Figat ut *Auſtralem* porrecti Sidere partem;
Ac *Boream* rigidi jaculetur liminis ignem,
Et *Vento* & *Pluviis* reparatâ luce carebit.

And as for the SUN-SETTING, it has been obſerv'd by M. *Ozanam*, that if it Sets under a thick Cloud, there will be *Rain* next Day: Or if it rains immediately, there will be a great deal of *Wind* next Day; which is almoſt the conſtant Conſequence of a Pale-ſetting SUN. Thus PLINY —

Si in Occaſu SOLIS pluet, aut Radii in ſe Nubem trahent, aſperam in proximum Diem Tempeſtatem ſignificabunt.

M. OZANAM ſays, a Red Sky at SUN-riſing is a Sign of *Rain*: But a Red Sky where the Sun ſets, is a Sign of *Fair Weather*. Indeed if the Sky be Red at a great Diſtance from the Part where the SUN ſets, as in the *Eaſt*, there will be either *Rain* or *Wind* the next Day.

When a thick white *Dew* lies upon the Ground in a Winter Morning, you'll have *Rain* the ſecond or third Day after.

VIRGIL's Remarks on the Setting-SUN are theſe (*Georg.* L. i.)

Hoc etiam, emenſo cum jam decedet Olympo,
Profuerit meminiſſe magis. Nam ſæpè videmus
Ipſius in vultu varios errare Colores.
Cæruleus Pluviam denunciat, *Igneus* Euros.
Sin maculæ incipient *Rutilo* immiſcerier *Igni*,
Omnia tum paritèr *Vento Nimbiſque* videbis
Fervere ———

i. e. But

i. e.

But more than all the SETTING-SUN ſurvey,
When down the Steep of Heav'n he drives the Day.
For oft we find him finiſhing his Race
With various Colours erring on his Face;
If fiery *Red* his glowing Globe deſcends,
High *Winds* and furious *Tempeſts* he portends;
But if his Cheeks are ſwoln with livid *Blue*,
He bodes *Wet* Weather by his Watry Hue:
If *Duſky* Spots are vary'd on his Brow,
And, ſtreak'd with *Red*, a troubl'd Colour ſhow,
That ſullen Mixture ſhall at once declare
Winds, *Rain*, and *Storms*, and Elemental War.

Another Sign of Rain is, when the SUN ſeems to be divided.

Alſo a Miſty and very Warm Air, after SUN-Riſing or Setting, eſpecially in the Spring or Autumn, is another Sign of *Rain*; becauſe it ſhews the Air is clogg'd with Vapours.

PLINY's farther Remarks on the SUN's Riſing or Setting, are theſe, L. 18. c. 35. *Nat. Hiſt.*

Si in Ortu SOLIS aut in Occaſu contracti cernentur Radii, *Imbrem* ſignificabunt.

Cum Oriente Sole Radii non illuſtres eminebunt, quamvis circundati Nube non ſint, *Pluviam* portendunt.

Si Nubes SOLEM circumcludent, quantò minus luminis relinquent, tantò turbidior *Tempeſtas* erit. Si verò etiam duplex Orbis fuerit, eò atrocior.

Si Oriens SOL cingetur Orbe, ex quâ parte is se aperit, exspectetur *Ventus.*

Si in Exortu longè radios per Nubes porriget, & medius erit inanis, *Pluviam* significabit.

Si ante Ortum Radii se ostendent, *Aquam* & *Ventum.*

Si circa Occidentem candidus Circulus erit, Noctis levem ostendet *Tempestatem:* Si Nebula, vehementiorem: Si candente SOLE, *Ventum:* Si ater Circulus fuerit, ex quâ Regione, is se ruperit, *Ventum magnum.*

The *English* of all which is this;

If the Rays of the SUN, *at his Rising or Setting, be shorten'd, 'tis a Sign of* Rain.

When the Rays of the SUN *at his Rising are not illustrious, tho' obscur'd by no Cloud, 'tis a Sign of* Rain.

When the SUN *is involv'd with Clouds, the Darker it is, the more* Tempestuous *it will be. But if the* SUN *seems to be divided, the* Storm *will still be the more violent.*

If the SUN *at his Rising, be encompass'd with an* Iris, *which Way soever the Circle opens, you may expect a* Wind.

If the SUN *at his first Rising has his Rays protracted a long Way thro' Clouds, and his Face obscure, 'tis a Sign of* Rain.

If the Rays of the SUN *are discover'd before he Rises himself, 'tis a Sign of* Rain *and* Wind *both.*

If a White Iris *be discover'd round about the Setting* SUN, *'tis a Sign of a small* Tempest *that Night: If he be surrounded by a little Cloud or Mist, then expect a vehement Tempest: But if he be surrounded by a Black Circle, from what Quarter soever it comes, you may expect a great deal of* Wind. So far PLINY,

Signs

Signs of Rain from the Moon.

THE MOON likewiſe has its Signs. Thus a Pale MOON is the Forerunner of *Rain*; Red, of *Wind*; Clear, of *Fine Weather*.

Pallida LUNA *pluit*, *Rubicunda flat*, *Alba ſerenat*. *Si rubicunda exorta eſt* LUNA, *Ventos*; *Si nigra*, Pluvias *portendere creditur*, ſays PLINY, L. 18. c. 35.

VIRGIL. *Georg.* L. 1.

LUNA revertentes cum primum colligit ignes,
Si Nigrum obſcuro comprenderit Aëra Cornu,
Maximas Agricolis Pelagoque parabitur *Imber*.
At ſi Virgineum ſuffuderit ore ruborem,
Ventus erit. Vento ſemper rubet aurea *Phœbe*.

i. e.

When firſt the MOON *appears, if then ſhe ſhrouds*
Her Silver Creſcent, tipp'd with ſable Clouds,
Conclude ſhe bodes a Tempeſt on the Main,
And brews for Fields impetuous Floods of Rain.
If the MOON's *Face with fiery Fluſhing glow,*
Expect the ratling Winds *aloft to blow.*

When the MOON is compaſs'd about with a very large Circle, or is Dim and Miſty, then *Wind* or *Rain* follows, or *Snow* ſpeedily, or likely within twenty-four Hours.

Two

Two or three diſcontinu'd and ſpeckled Circles or Rings round about the MOON, foretel a great *Storm.*

If the MOON's Horns are blunt at its firſt Riſing, at, or within two or three Days after the Change, it denotes *Rainy* Weather for that Quarter; but *Seaſonable* Weather the other Quarters.

In Quinta (ſays PLINY) Cornua LUNÆ obtuſa, Pluviam: Erecta & infeſta, *Ventos* ſemper ſignificant: Quarta tamen maxime— Si Quartam Orbis rutilus cinget, *Ventos* & *Imbres* præmonebit.

Naſcens LUNA (ſays VARRO) ſi Cornu ſuperiore obatro (vel obatrato) ſurget, Pluvias decreſcens dabit: Si inferiore, ante Plenilunium: Si in Mediâ nigritia illa fuerit, *Imbrem* in Plenilunio.

i. e.

If the Horns of the MOON (ſays PLINY) *are Obtuſe the fifth Day after the Change, it ſignifies* Rain: *But if ſharp, it ſignifies* Wind, *eſpecially the fourth Day— If the* MOON *be encircl'd with a clear ruddy* Iris *the fourth Day, it foretels* Wind *and* Rain *both.*

VARRO ſays, if the New-MOON riſes with its uppermoſt Horn ſomewhat Black, it will produce *Rain* in its Decreaſe: But if its Lower Horn be ſomewhat Black, 'twill produce *Rain* before the Full: But if the Blackneſs be in the Middle of the MOON, it will be *Rain* in the Full.

Others

Others have obſerv'd, that an *Iris* round the MOON, is likewiſe a Sign of *Rain*, with a South Wind.

And that if the Wind be South the third Night after the Change of the MOON, then you may expect *Rain*, more or leſs the Day following.

And that likewiſe if the Wind be South, and the MOON not ſeen before the fourth Night, you may expect *Rain* moſt Part of that Month.

What I ſhall further obſerve concerning the MOON is this, There have been very Ingenious Gentlemen who have been zealous Advocates for the *Lunar Influence* on Terene Bodies, and have upon many Years Experience aſſerted, that every New and Full MOON brings Humid Air within the Compaſs of the *Triduum*, and that it ſeldom fails of *Raining* within the Space of three Days Before or After every Change and Full; and particularly that the Full MOON in *April* always brings *Rain*, and that the New and Full MOON in *Auguſt* do the like: And that this Rule has not fail'd above Once in almoſt Thirty Times.

Give

Give me leave to add one or two Prognoſtic's more of *Rainy* Weather, and thoſe are the *Mock-Suns* and *Moons*. The *Parhelia* or *Mock-Suns* are ſo many *Images* of the true *Sun* caſt upon one or more ſmooth compacted *Cloud* or *Clouds* on one or both Sides of the *Sun*. Theſe Appearances are chiefly ſeen about the Riſing and Setting of the *Sun*. Sometimes there are ſeen ſeveral little *Mock-Suns* like *Stars*: *Des Cartes* ſays 'tis poſſible there may be ſeven ſeen at one Time. This Multiplicity is caus'd by many little divided *Clouds*, like the Reflection of a Man's Face on a Multiplying-Glaſs. The Appearance of theſe *Phænomena* predicts *Tempeſts* and *much Rain*; becauſe they cannot appear but in a Watry Diſpoſition of the Air. If they appear on the *South* Side of the *Sun*, they are the Forerunners of more *violent Showers of Rain* than on the *North* Side: Becauſe the *Southern* Vapours are ſooner diſſolv'd into Water than the Colder *Northern* ones.

As for the *Mock-Moons* (which have the ſame Cauſe as the *Mock-Suns*) they are the Forerunners of *Great Rains, Land-Floods*, and *diſmal Inundations*.

Signs

Signs of Rain from the Stars.

NOR are the STARS (tho' at ſo great a Diſtance) deſtitute of their Signs. The STARS ſeeming Bigger than uſually, Pale, Dull, and not twinkling, ſhew the Air is condenſing to *Rain*, which will ſoon fall.

Alſo the STARS appearing more Bright and Blazing than ordinary in Summer, is a Sign of great *Winds* and *Rain.*

Likewiſe many STARS appearing in the Night and ſeeming a greater Number than uſual, and the Wind at Eaſt in Summer, foretels *ſudden Rain.*

Signs of Rainy Weather from the Clouds

AS the *Atmoſphere* (or Body of groſſer Air ſurrounding the Globe) riſes and reaches above five Miles in Height (as is ſuppos'd) there is Room ſufficient in ſo expanſive a Fluid for the Reception and Diſtribution, for the Diſſipation or Collection of all Kinds of *Vapours* and Exhalations that are rais'd up either by the Solar or Subterranean Heat.

To what Height the *Vapours* aſcend, does in a great meaſure depend upon the Degree of Heat wherewith they are actuated and diſtended, upon the Fineneſs and Lightneſs of the *Vapours* themſelves, upon the Denſity of the *Air* wherein they are buoy'd up; and even ſometimes upon the Strength and Force of the *Winds* wherewith they are impell'd. Some of them are ſo far ſubtiliz'd and attenuated, and riſe to ſo great a Height as not to be diſtinctly viſible, of which Kind (in Sir ISAAC NEWTON'S Opinion) are thoſe that form by Rarefaction the Blue or Azure Colour of the Sky. Other *Vapours* of a groſſer Kind, being compacted into CLOUDS, and keeping for ſome Time a fixt Station in the Regions above, have (as Mr. BOYLE tells us) been reckon'd about Half a Mile high, but very few, and thoſe the Whiteſt and Loftieſt CLOUDS, above three Quarters of a Mile High.

If the Force wherewith a Stormy or Thunder CLOUD is impell'd, be ſuperior to that of its Gravitation, then the farther any ſuch CLOUD moves on in a direct Courſe, the Higher muſt ſuch a CLOUD riſe;

riſe; and the leſs Reſiſtance it meets with from the Upper Regions, the ſwifter it will move: But when the protruſive Force of the *Wind* abates, and that of Gravitation prevails, the CLOUD it ſelf will acquire a Degree of Velocity from its extraordinary Height, and fall down in violent *Rain* or *Hail*.

And this will let us into the Natural Reaſon of a Vulgar Obſervation, *viz.* That in CLOUDY and Stormy Weather, when the *Wind* falls, it will commonly *rain*, becauſe the CLOUDS are carried on by the Strength of the *Wind*, in a ſtrait Courſe to a greater Height than the Denſity of the Superior Regions can ſupport; as ſoon therefore as the Horizontal Impulſe ceaſes, the CLOUDS, by their own natural Gravity, muſt deſcend in *Rain*.

So much in General for the Prognoſtications of *Rainy* Weather from the CLOUDS. But to be more Particular:

Many ſmall CLOUDS at North-Weſt, in the Evening, ſhew that *Rain* is gathering and will ſuddenly fall.

CLOUDS appearing like Rocks or Towers, ſignify *great Showers*.

If ſmall CLOUDS grow bigger and bigger in an Hour or two, they ſignify a great deal of *Rain*. On the contrary, if great CLOUDS ſeparate, waſte off, and grow ſmaller and ſmaller, they ſignify *Fair Weather*.

In Summer (ſays M. OZANAM) we apprehend a future *Storm* when we ſee little black looſe CLOUDS lower than the reſt, wandering to and fro: When at *Sun-riſe* we ſee ſeveral CLOUDS gather in the *Weſt*; and on the other hand, if theſe CLOUDS diſperſe, it ſpeaks *Fair* Weather.

The often Changing of the *Wind*, which is particularly known by the Courſe of the CLOUDS, is a Sign of *Rain*; becauſe the CLOUDS are driven with the *Winds*, and the Vapours collected and condens'd, which cauſes *Rain*.

When the *Sun* looks Double or Triple thro' the CLOUDS, it prognoſticates a *Storm* of long Duration. PLINY (in his *Nat. Hiſt.* L. xviii. c. 35.) ſays—

NUBES ab Auſtro *Imbres* portendent.

NUBES vehementius atræ ab Oriente, in noctem *Aquam* minantur: ab Occidente, in poſterum diem.

Si NUBES, ut Vellera Lanæ, ſpargentur multæ ab Oriente, *Aquam* in triduum præſagient.

Cum in cacuminibus Montium NUBES conſident, *hyemabit*.

i. e. CLOUDS

i. e.

CLOUDS *coming out of the South, bring* Rain.

Very Black CLOUDS *coming out of the Eaſt, threaten* Rain *at Night: Out of the Weſt, the next Day.*

If many CLOUDS (*like Fleeces of Wool*) *are ſcatter'd from the Eaſt, they foretel* Rain *for three Days together.*

When CLOUDS *ſettle upon the Tops of Mountains, 'tis a Sign of* Hard Weather.

Signs of Rain from the Rain-bow.

IF after a long Drought the RAIN-BOW appears, it ſignifies *Rain:* But if it appears after a long Time of Wet, it ſignifies *Fair Weather.*

If it appears very Big, and the Green Colour predomimant, it ſignifies much *Wet:* But if Red be the predominant Colour, then it denotes *Rain* and *Wind* together.

If (after it appears) the Colours grow groſſer and darker, *Rain* is gathering: If lighter and fairer, the Contrary.

If it be broken in many Parts, *Tempeſtuous Winds* are gathering in the Air.

From what Part the RAIN-BOW firſt begins to break, or vaniſh, *Winds* will ariſe and bring *great Showers.*

If

If the RAIN-BOW vaniſhes and diſappears altogether, *Fair Weather* will enſue.

If it appears in the Morning, it ſignifies ſmall *Rain*, and preſently after *Fair Weather*.

If it appears at Noon, it brings a great deal of *Rain*. *A Meridie Ortus magnam vim* Aquarum *vehit*, ſays SENECA, (L. i. *Nat. Quæſt.* c. 6. p. 836.)

If it appears at Night, then *Fair Weather*. According to the Vulgar Saying,

A RAIN-BOW *in the Morning*
Is the Shepherd's Warning:
A RAIN-BOW *at Night*
Is the Shepherd's Delight.

A RAIN-BOW in the *Eaſt* or *South* (ſays M. OZANAM) is a Sign of *Great Rain*, eſpecially if it be of a bright lively Colour: But a RAIN-BOW in the *Eaſt* in the Evening, predicts *Fair Weather*; and if its Colour be Lively and Red, it foretels *Wind*. A RAIN-BOW in the *Weſt* preſages an indifferent Quantity of *Rain* and *Thunder*.

If two RAIN-BOWS appear together, it denotes *Fair Weather* for the Preſent, and *Rain*

Rain two or three Days after. But two RAIN-BOWS appearing at the ſame Time, one hanging down from the *South*, the other from the *North*, denote *Rain* to follow.

I ſhall conclude this Chapter with an Account of ſome uncommon RAIN-BOWS; one of which was a *Lunar Rain-bow* in *Derbyſhire*, obſerv'd by the Curious Mr. THORESBY about *Chriſtmas*, 1710. About Eight in the Evening he obſerved with great Satisfaction the *Bow* the *Moon* had fix'd in the Clouds; ſhe had then paſt her *Full* about twenty-four Hours: The Evening had been Rainy, but the Clouds were now diſpers'd, and the *Moon* ſhon pretty clear. This *Iris* had all the Colours of the *Iris Solaris* exceeding pleaſant, diſtinct and grateful to look on, only faint, comparatively to thoſe we ſee in the Day; as muſt neceſſarily follow both from the different Beams that cauſe it, and the Diſpoſition of the *Medium*. The Largeneſs of the Arc was not ſo much leſs than that of the *Sun*, as the different Dimenſions of their Bodies, and their reſpective Diſtances from the Earth, ſeem to require.

But

But as to its Entireneſs and Beauty of its Colour, 'twas admirable and ſurprizing. It continu'd about ten Minutes before the Interpoſition of a Cloud hinder'd his further Obſervation. Vid. *Philoſoph. Tranſ.* N° 331. p. 320.

M. BOURZES (in *Phil Tranſ.* N° 337. p. 235.) gives us an Account of *Marine Iris's* — The Sea was very much toſt, and the Wind coming off the Tops of the Waves, made a kind of Rain, in which the Rays of the *Sun* painted the Colours of a RAIN-BOW. 'Tis true, the Common *Iris* has that Advantage over ours, that its Colours are more lively, diſtinct, and of longer Extent. In the *Marine Iris*, we cou'd diſtinguiſh only two Colours; a dark Yellow on that Side next the *Sun*, and a pale Green on the oppoſite Side; the other Colours were too faint to be diſtinguiſh'd. But theſe *Iris's* are in a great Number; one may ſee twenty or thirty together, they appear at Noon-day, and in a Poſition oppoſite to that of the Common *Rain-bow*, that is to ſay, the Curve is turn'd as it were towards the Bottom of the Sea: *Et bibit ingens* ARCUS (as VIRGIL ſays) And at both Ends the RAIN-BOW drinks the Sea. *Signs*

Signs of Rain ceasing.

WHEN a *Shower* comes suddenly, 'tis like to be Fair Weather again in the Space of Half an Hour or an Hour: For there is no *Rain* continues long that comes suddenly; *Nullum Violentum est Diu turnum.*

Also, if it begins to *Rain* an Hour or two before Day, it is like to be Fair before Noon, and to hold so all the rest of the Day. But if it begins to *Rain* an Hour or two before Sun-rising, it is like to *Rain* most Part of the Day after.

Or, when the Air grows thick by Degrees, and the Sun shines duller and duller, till it shines not at all; or the Moon or Stars by Night; then it is like to *Rain* six Hours usually.

Also, when it begins to *Rain* from the South with a High Wind for two or three Hours, and then the Wind falls (and it continue *Raining* still) then it is like to *Rain* for twelve Hours or more; and usually *Rains* till a strong Wind arises to clear the Air. These long *Rains* seldom hold

above twenty-four Hours, or ſeldom happen above Once a Year.

Signs of the Weather from Miſts.

IF the MISTS ariſe out of Ponds and Rivers, and there vaniſh away (*i. e.* are either Exhal'd or Subſide) they ſignify *Fair Weather.* But if from thence they are attracted to the Top of Hills, 'tis like there will be *Rain* ſuddenly, either the ſame Day, or commonly within two or three Days.

When a MIST, or thin Cloud, happens in a Dry Seaſon, and aſcends Upwards, and is turn'd into a thick Cloud, it is a Sign that *Rain* will follow: But when a MIST falls Downward quickly after *Rain*, it is then a Sign of *Fair Weather.*

If before Sun-riſing it be a General MIST (both on the Hills and Vales) near the Full-Moon, it ſignifies *Fair* Weather. But if ſuch a MIST be in the New of the Moon, it ſignifies *Rain* in the Old of the Moon: But in the Old of the Moon, it ſignifies *Rain* in the New.

If (ſays M. OZANAM) after Sun-ſet, or before Sun-riſe, you obſerve a White Vapour

pour rising upon Waters, or Marshes or Meads, you will have *Fair* Warm Weather next Day.

Indeed I look upon MISTS as only thinner, uncompacted, and more rarify'd *Clouds* which hang upon the Earth: And tho' we don't call them so whilst we are involv'd in them, yet as soon as they are a little elevated and drawn up, we immediately call them *Clouds:* And oftentimes they are, by the Cold in the Atmosphere, and at no great Distance from us, so condens'd, that they suddenly return upon us in great Showers of *Rain:* Hence 'tis a Common Observation, that when a MIST is drawn up to the Tops of the Hills, 'tis a Sign of *Rain:* But when we see MISTS driven along the Valleys, the Sun rarifying and dispersing them, 'tis a Sign of *Fair* Weather. For as MISTS are nothing else but thin and rarify'd Clouds, so are Clouds nothing but thick, condens'd, and compacted Vapours or MISTS; which when so far condens'd as to become too ponderous to be supported by the Air, fall down upon us in *Rain, Hail,* or *Snow.*

Signs of the Weather from Vegetables.

'TIS very pleasant to observe the Methods of Nature, in guarding the Insensitive Creatures in the *Vegetable* Kingdom, against Harms and Inconveniencies. I have observ'd that many, if not most of them, do expand their Flowers and Down in Warm, Sun-shiny Weather, and again close them towards Evening, or in Rain, especially at the Beginning of Flowering, when the Seed is young and tender: It is manifest in the Down of *Dandelion*, and other Downs; and eminently in the Flowers of the *Pimpernel*; the Opening and Shutting of which, are the Country-man's Weather-glass, whereby GERARD says, he foretels what Weather shall follow next Day; for (says he) if the *Flowers* be close shut up, it foretels *Rain* and Foul Weather; contrariwise, if they be spread abroad, *Fair* Weather (GER. HERB. B. ii. c. 183. p. 494.) There are three Sorts of this Plant call'd *Pimpernel*, *Anagallis mas*, *fœmina*, *& lutea*. 'Tis like *Chickweed*, the Stalks four-square, trailing upon the Ground,

Ground, beſet with Leaves oppoſite to one another, like *Nummularia* or *Money-wort*, between which on each Side of the Stalk there ſhoot up two ſmall Tendrels in the Male and Female *, on the Top of which in the Male grow ſmall Flowers of a Purple Colour; in the Female perfect Blue Flowers; in the Yellow *Pimpernel* there are only ſingle Tendrels bearing ſingle Yellow Flowers. Theſe *Pimpernels* grow commonly in Gardens and plow'd Fields near Path-ways. They flower about *Auguſt*, and ſo are of good Service to the Husbandmen in managing their Harveſt-Work by foretelling the Weather.

Likewiſe the TREFOIL (ſays my Lord BACON) ſwells in the Stalk againſt *Rain*, and ſo ſtands more Upright; for by *Wet* Stalks do erect, and Leaves bow down. TRIFOLIUM (ſays PLINY) *inhorreſcere, & Folia contra Tempeſtatem ſubrigere, certum eſt.*

The

* *The Diſtinction between Male and Female Plants or Trees, is found to be a Vulgar Error: For every Plant or Tree contains in it ſelf Male and Female Powers, having their Seeds in themſelves (as* MOSES *obſerves) and wanting Local Motion, are able to propagate without the Help of one of the ſame Species.*

The Natural Reaſon of all which is this, PLANTS are a ſort of Natural *Hygrometers*, being compos'd of an infinite Number of Fibres, *Tracheæ* or Air-Veſſels, Arteries and Veins, which are like ſo many Canals or Pipes, thro' which the Moiſture of the Air, as well as the Juice of the Earth, is convey'd into all their Parts.

PLANTÆ igitur (ſays MALPIGIUS) cum ſint Viventia (ut conjecturari fas eſt) Viſceribus infixa Terræ, ab hâc, ſeu potiùs ab Aquâ & Aëre, commixtis & percolatis à Terrâ, Reſpirationis ſuæ materiam recipiunt, ipſarumque *Tracheæ* ab halitu Terræ, extremas Radices ſubingreſſo, replentur. i. e.

Since PLANTS *are Vegetables and fixt in the Bowels of their Mother Earth, they receive the Matter of Reſpiration from Her, and rather from Water and Air drain'd from the Earth; and their Air-Veſſels are repleniſh'd from the* Halitus *of the Earth, being ſuck'd in at the Extremities of the Roots.*

Theſe *Tracheæ* or Air-Veſſels are viſible, and appear very pretty in the Leaf of the *Scabious*, or the *Vine*, by pulling aſunder ſome of its principal Ribs, or great Fibres; between which may be ſeen the Spiral *Air-Veſſels* (like Threads of Cobweb) a little uncoyl'd: A Figure whereof Dr. GREW has given us in his *Anat. Plant.* Tab. 51, 52.

Vid. MALPIG. *Op. Anat. Plant.* p. 15.
Dr. GREW's *Anat. Plant.* L. iii. c. 3. § 16, &c.
Mr. RAY's *Hiſt. Plant.* L. i. c. 4.

Signs

Signs of Fair Weather:
First from the SUN.

THE SUN rising in the Morning fair and bright, and setting at Night blushing, without Spots or black Clouds near it, is one Sign of *Fair* Weather. Thus PLINY, L. xviii. c. 35.

SOL purus Oriens, atque non fervens, *Serenum* diem nunciat. Si & occidet pridiè Serenus, & Oritur, tanto certior fides *Serenitatis.*

Si circa SOLEM Occidentem rubescant Nubes, *Serenitatem* futuræ Diei spondent.

Si ab Ortù SOLIS repellentur Nubes, & ad Occasum abibunt, *Serenitatem* denunciabunt.

Si SOL Oriens cingetur Orbe, & posteà totus defluxerit æqualitèr, *Serenitatem* dabit.

i. e.

The SUN *rising clear, and not Hot, promises a* Fair *Day. If it rises clear, and sets clear the Day before, you may be the more sure of* Fair *Weather.*

If the Clouds about the Setting SUN *look Red, the next Day is like to be* Fair. *According to an old Saying,*

The Evening Red, and the Morning Grey,
Is a Sign of a *Fair* Day.

If the Clouds are driven from the SUN-*rising, and pass away to the* West, *it is a Sign of* Fair *Weather.*

*If the Rising-*SUN *be encompass'd with an* Iris, *and afterwards that* Iris *wear away equally on all Sides, it is a Sign of* Fair *Weather.*

Signs

Signs of Fair Weather from the MOON *and* STARS.

THE MOON, when she is three or four Days old, and has her Horns sharp and pointed very bright, predicts *Fair* Weather till the *Full,* if not all the Month.

A bright or shining Circle about the MOON when at *Full*, promises *Fair* Weather for many Days. Thus VIRGIL,

Sin Ortu in Quarto (namque is certissimus Auctor)
Pura, neque obtusis per Cœlum cornibus ibit,
Totus & ille Dies, & qui nascentur ab illo
Exactum ad Mensem, *Pluviâ Ventisque* carebunt.

i. e.

The MOON, *if four Nights old (the surest Sign)*
With sharpen'd Horns if glorious then she shine,
Next Day, nor only that, but all the MOON;
'Till her revolving Race be wholly run,
Are void of Tempests both by Land and Sea.

And hence PLINY, L. 18. c. 79.

Quartam LUNAM maximè observat *Ægyptus.* Si splendens Exorta puro nitore fulsit, *Serenitatem* præsagit ——— Si Plenilunio per dimidium pura erit, Dies *Serenos* significabit. i. e.

The Ægyptians *make their Observations upon the* MOON *chiefly when she is four Nights Old. If she rises Fair and Clear, she promises* Fair *Weather* ——— *If she be but half clear at the* Full, *you may expect* Fair *Days.*

The

The STARS likewiſe ſhining Clear and Bright, ſeeming to dart out pointed Rays, denote *Fair* Weather. Thus VIRGIL;

—— Neque inſidiis Noctis capiere Serenæ.
Nor ſhall a Starry Night thy Hopes betray.
Nam neque tum STELLIS acies obtuſa videtur,
The STARS ſhine ſmarter ——

Signs of Fair Weather from the CLOUDS.

LITTLE CLOUDS ſinking low, as into Valleys, at South-Eaſt, or South-Weſt, are Signs of *Fair* Weather. So VIRGIL;

At NEBULÆ magis ima petunt, campoque recumbunt.
But a blue doughty MIST *deſcends upon the Plain.*

And PLINY,

NEBULÆ è Montibus deſcendentes, aut Cœlo cadentes, vel in Vallibus ſidentes, *Serenitatem* promittunt.

Another Sign of *Fair* Weather is, when the CLOUDS drive one way, and the *Wind* another; becauſe the Wind rarifies the Air, and ſo keeps up the Rain.

Alſo CLOUDS appearing white like Fleeces of Wool, ſcatter'd about in the Sky to the *North-Weſt*, and the SUN of a good Height, are another Sign of *Fair* Weather.

MISTS likewiſe, or white Clouds, hanging juſt over Rivers, and diſperſing no farther.

The *Rain-bow* alſo appearing after a Shower, and the Blue and Yellow Part of it very Bright, and the lighteſt Colour, are Signs of *Fair* Weather.

Alſo a *Rain-bow* of only two Colours, Red and Yellow, is a Sign of *Fair* Weather.

Frequent Flaſhes of Lightning without Thunder, in an Evening, is alſo a Sign of *Fair* Weather the next Day.

Another Sign of *Fair* Weather, is the Clearneſs on the Tops of Hills — *Si cacumina* Montium *pura fient*, *Dies* Serenus *erit*, *ſays* PLINY.

Signs of Fair Weather from INSECTS.

SPiders Webbs in the Air, or on the Graſs and Trees, foretel very *Fair* and Hot Weather. Dr. LISTER (*Philoſ. Tranſ.* N° 50. p. 1014.) gives a full Account of theſe *Spiders* (call'd *Lupi*) darting their Threads into the Air, and ſwimming in it. All *Spiders* that ſpin in a Thread, are the Makers of thoſe long Threads in the Air in Summer, and eſpecially towards *September*,

tember, ſo much wonder'd at, and in ſuch infinite Numbers every where. They will dart out a whole *Stamen* or Sheaf at once, conſiſting of many Filaments; yet all of one Length, all divided each from the other, and diſtinct, till ſome Chance either ſnap them off or entangle them. The ſame Ingenious Author taking notice one Day that the Air was full of theſe *Spiders Webbs*, got upon the Top of the Higheſt Steeple on the Minſter of *York*, and did thence diſcern them yet exceeding High above him.

Other Signs of *Fair* Weather we have from other INSECTS, particularly BEES, when they fly far from their Hives, and come late Home. Great Swarms of GNATS preſage the ſame.

So do GLOW-WORMS by Night. Theſe (ſays Dr. POWER, in his *Microſ. Obſ.* p. 23.) are thoſe *Night-Animals* with their Lanthorns in their Tails, thoſe Creeping *Stars*, (*Stellæ Terreſtres*, MOUFFET calls them) that ſeem to out-ſhine thoſe in the Firmament, and to out-vie them too in this Property eſpecially, that whereas the *Celeſtial Lights* are quite obſcur'd by the Interpoſi-

tion of a ſmall Cloud, theſe *Terreſtrial Stars* are more enliven'd and enkindl'd thereby, whoſe pleaſant Fulgor no Darkneſs is able to eclipſe. Theſe INSECTS are of the *Beetle* kind, call'd by the *Greeks Lampyrides*, à λάμπω, *luceo*. The Tail of a GLOW-WORM is made of ſeven Shelly Rings, at the laſt of which are viſible the two Shining Points. The Light made by this INSECT (ſays Sir THOMAS BROWN, in his *Vulgar Errors*) depends upon a living Spirit, and ſeems by ſome Vital Irradiation to be actuated into this Luſtre; for when they are dead, they ſhine not, nor always when they are alive, but give Light according to the Diffuſion of this Spirit, and the Protuſion of their Luminous Parts. But ALEXANDER ROSS (in his Animadverſions on Dr. BROWN's *Vulgar Errors*, in his *Arcana Microcoſmi*, pag. 142.) makes this Remark — "When (ſays he) "Sir THOMAS BROWN ſays that the Light "of the *Glow-worm* depends upon a liv-"ing Spirit, he expreſſes but a remote "Cauſe: for the Proximate and Immediate "Cauſe is the Natural Heat in a clear "Luminous Water or Humor: For I have

"ob-

" obſerv'd in thoſe I kept ſome Days in " Graſs, that as this Heat decreas'd, the " Humor thickned, and as it were con- " geal'd, and ſo the Light grew dimmer; " being quite Dead there remain'd the " congeal'd Humor white like a Piece of " Chalk. Thoſe I took were for three " or four Nights ſo Shining, that holding " a Book near, I cou'd ſee to read by them."

Theſe INSECTS are the *Husbandmen's* Monitors to bring in their Harveſt; as VIRGIL ſays,

His tandem ſtudiis Hyemem tranſegimus illam.
Ver rediit, jam Sylva viret, jam Vinea frondet,
Jam ſpicata CERES, jam cogitat horrea Meſſor
Splendidulis cum Nocte volant *Lampyrides* alis.

Altho' (as MOUFFET remarks) *In omnibus Regionibus non eſt idem Tempus Meſſis.*

Signs of Fair Weather from BIRDS.

LARKS riſing very High, and continuing Singing for a long Time.

The KITE alſo flying aloft, ſhows *Fair* and Dry Weather. The Reaſon of which (ſays my Lord BACON) may be this, Becauſe the *Kite* mounts moſt into the Air of that Temper wherein he delights: For this

this aſpiring *Bird* affects not ſo much the Groſſneſs of the Air, as the Cold and Freſhneſs of it; for being a *Bird* of Prey, and therefore Hot, he delights in the freſh Air, and many times flies againſt the Wind, as *Trouts* and *Salmons* ſwim againſt the Stream. And yet it is true alſo, that all *Birds* find an Eaſe in the Depth of the Air, as *Swimmers* do in a Deep Water. And therefore when they are Aloft, they can uphold themſelves with their Wings ſpread, ſcarce moving them. The like PLINY obſerves of the CRANE—— GRUES *ſilentio per ſublime volitantes, Serenitatem præſagiunt.* SWALLOWS likewiſe flying High preſage *Fair* Weather. And PLOVERS or LAP-WINGS flying High, and then Low, making alſo continual Cries, fore-ſhow *Warm* Weather. The like VIRGIL elegantly remarks of the RAVENS,

Tum liquidas CORVI preſſo ter gutture voces
Aut quater ingeminant: & ſæpè cubilibus altis
Neſcio quâ præter ſolitum dulcedine læti
Inter ſe foliis ſtrepitant: Juvat imbribus actis
Progeniem parvam dulciſque reviſere nidos.
Haud equidem credo, quia ſit Divinitus illis
Ingenium, aut rerum Fato Prudentia major.
Verum, ubi Tempeſtas & Cœli mobilis humor
Mutavere

Mutavere vias, & JUPPITER uvidus Auſtris
Denſat, erant quæ rara modo, &, quæ denſa, relaxat;
Vertuntur Species Animorum, & pectora motus
Nunc alios, alios, dum Nubila Ventus agebat,
Concipiunt. Hinc ille AVIUM Concentus in Agris,
Et lætæ PECUDES, & Ovantes gutture CORVI.

i. e.

Then thrice the RAVENS *rend the liquid Air,*
And croaking Notes proclaim the ſettled Fair.
Then round their Airy Palaces they fly
To greet the SUN; *and ſeiz'd with ſecret Joy,*
When Storms are over-blown, with Food repair
To their forſaken Neſts, and callow Care.
Not that I think their Breaſts with Heav'nly Souls
Inſpir'd, as Man, who Deſtiny controuls.
But with the changeful Temper of the Skies,
As Rains condenſe, and Sun-ſhine rarifies;
So turn the Species in their alter'd Minds,
Compos'd by Calms, and diſcompos'd by Winds.
From hence proceeds the BIRDS *harmonious Voice,*
From hence the CROWS *exult, and friſking* Lambs *rejoice.*

BATS likewiſe flying about in the Evening ſooner and more than uſual, is a Sign of *Fair* and *Hot* Weather the next Day. For the Clearneſs of the Air enlivens theſe *Birds*, or rather Flittering Mice.

OWLS Hooting much is another Sign of *Fair* Weather; tho' *Owls* hoot much both in Wet and Dry Weather, with this Difference,

ference, in Wet their Hooting is more Clamorous, as PLINY obſerves — NOCTUA *in imbre garrula :* But in Fair Weather, more Eaſy and Sedate, as VIRGIL ſays,

SOLIS & Occaſum ſervans de culmine ſummo
Nequicquam ſeros exercet NOCTUA cantus.

i. e.

And OWLS *that mark the Setting-Sun declare*
A Star-light Evening, and a Morning Fair.

Alſo *HALCYONS, *i. e.* King-Fiſhers and COOTS, and other Sea-Fowl, leaving the Shores and flocking to Sea, is another Sign of *Fair* Weather. Thus VIRGIL again ;

Non tepidum ad SOLEM pennas in littore pandunt
Dilectæ *Thetidi* ALCYONES ———

i. e.

The filmy GOSSAMER *now flits no more,*
Nor HALCYONS baſk on the ſhort Sunny Shore.

And PLINY ſays, L. ii. c. 47. L. 18. c. 26.

ALCEDO ſeptem Diebus nidificat in Mari, & ſeptem poſtea fœtificat ; qui Dies HALCEDONII dicuntur, quibus Diebus Mare *placidum* & navigabile eſt. Hoc ergo Signum eſt, cum ALCEDONES non pandunt alas.

i. e. *The*

* Halcyon (*the King's Fiſher*) *Gr.* Ἀλκυὼν, παρὰ τὸ ἐν ἁλὶ κύειν, quòd concipiat in Mari, & in eo fœtus excludat. Lat. *Halcédo*, ab algére quod algidis & frigidis temporibus in Mari pariat. Interea verò ſerenum eſt Cœlum, tranquillum Mare. Undè Dies illi ſereni *Græcis* Ἀλκυονίδες, Latinis *Halcyonia* dicuntur.

i. e.

The HALCYON *is seven Days in building her Neſt in the Sea, and ſeven Days in bringing forth her Young; which Days are call'd* HALCYON-*Days, in which Days there is a perfect Calm at Sea. This therefore is the Signal to Mariners, when the* HALCYON-*Bird ceaſes flying about.*

Signs from FISHES.

NOT only BIRDS but FISHES alſo, by their frequent Riſing and Flurting upon the Surface of the Water, do foretel *Fair* Weather.

DELPHINI (*ſays* PLINY) turbato Mari ſpargentes Aquam, *Tranquillitatem* præſagiunt; i. e. *The* DOLPHINS *ſpurting up Water in a Storm, foretel a* Calm.

Signs of the Weather from the WINDS.

THE Reverend and Learned Mr. SAUL (in his Hiſt. and Philoſ. Account of the Barometer) gives us this Account of the WINDS—— As the WINDS encreaſe the Quantity and Weight of the Air, and by that means ſupport the Vapours; ſo are they ſometimes the immediate Occaſion of their Falling. For when (for Inſtance) the *Winds* blow from oppoſite

Quarters, the Miſts and Vapours floating in the different Streams of Air, muſt be forcibly driven againſt each other, and confuſedly mix'd and blended together: and as they were before ſeparately æquiponderate to the *Air*, and for that Reaſon floated in it, ſo after ſuch Confluence and Conjunction, they will doubly exceed the Weight of the Air, and force their Deſcent thro' it. And this is uſually the Cauſe, both of the largeſt Drops, and of the greateſt and moſt plentiful *Rains*. But when either of theſe Oppoſite *Winds* riſes and prevails, and turns the whole Stream of Clouds and Vapours only one way, it ſoon clears the Hemiſphere, and reſtores better *Weather*. From hence we may farther obſerve, that the particular Effect the *Winds* have upon the Changes of the *Weather*, depends, in a great meaſure, upon the preſent State and Quality of the *Atmoſphere*; for when that is Moiſt and Humid, or charg'd with Clouds and Vapours, the Change of the *Wind* into an Oppoſite Quarter, ſoon produces *Rain*: But when the *Atmoſphere* is clear and free from Vapours, it adds to the Weight and Quan-

Quantity of the Air ; and, by that means, continues and prolongs *Fair* Weather.

The WINDS are the Cauſe of the ſudden and extraordinary Alterations of the Gravity of the *Air* ; the Nature of the WINDS is ſuch, that by the Experience we have of them, we may thence predict (very near) the Weather that will enſue for two or three Days after. We know (for Example) in this Climate, that a *South*-Wind generally brings *Rain*, and a *Weſt*-Wind yet more ; (which is the predominant *Wind* here, becauſe the Ocean lies on that Side) That the *North*-Wind brings *Fair* Weather, as well as the *Eaſt*-Wind, which does not laſt ſo long as the former. Therefore the *North-Eaſt* and *South-Weſt Winds* are the only *Winds* that I ſhall inſiſt upon at preſent.

It has been an Obſervation made by ſome, that have been very Curious Obſervers of the Weather for many Years, That in eight Years Time there is as much *South* and *Weſt* Wind, as *North* and *Eaſt Wind* ; and conſequently as many Wet Years as Dry.

Now I will give you a Rule how you may know when the WIND will ſit in no

one of these two Points for two or three Months together, for the most part.

First, for the *North-East* Wind: When the *Wind* turns to this Point, and continues two Days without Rain, and turns not *Southward* the third Day, nor Rains, then it is like to continue *North-East* for eight or nine Days without Rain, and then return into the *South*.

If the *Wind* turn out of the *South* to the *North-East* again, and continue in that Point without Rain for two Days, and turn not *South* the third Day, nor Rain the third Day, it is like to continue *North-East* for two Months, or three for the most part. The *Wind* will finish these Turns towards the *North* in three Weeks Time.

Secondly, for the *South-West* Winds: When the *Wind* has been in the *North* for two Months or more for the most part, and comes to the *South*, usually there are three or four Fair Days at first, and then the fourth or fifth Day comes Rain, or else the *Wind* turns *North*, or continues Dry still.

If it return to the *South* within a Day or two without Rain, and turn *Northward* with Rain, and return into the *South* the firſt or ſecond Day as before, two or three times together after this ſort, then it is like to be in the *South* or *South-Weſt* two or three Months together for the moſt part, as it was in the *North* before. The *Wind* will finiſh theſe Turns in a Fortnight.

I mention not the *Eaſt* or *Weſt* Winds, becauſe the Rain comes uſually from the *South*, or in the Shifting of the *Wind* from the *South* to the *North*. As for the Drought, the *Wind* is for the moſt part *North-Eaſt*.

If it be fair Weather out of the *South* for a Week together (which is not uſual) it is like to be great Drought, when it has been a long Time of Rain out of the *South* before.

Uſually the *Wind* turns from the *North* to the *South* quietly without *Rain*, but comes back again into the *North* with a ſtrong *Wind* and *Rain*. The greateſt *Winds*, which blow down Houſes and Trees, uſually come by the Turning of the *Wind* out of the *South* by the *Weſt*, into the *North*, which drives away Rain and clears the Air. PLINY

PLINY (in his *Nat. Hiſt.* L. ii. c. 47. & L. xviii. c. 34.) gives this Account of the WINDS:

Auſter Africæ ſerenus, Aquilo nubilus. Omnes *Venti* vicibus ſuis ſpirant. De ratione eorum Menſtrua, Quarta maximè *Luna* decernit——*Auſtro* majores flatus eduntur quàm *Aquilone:* quoniam ille infernus ex imo Maris ſpirat, hic ſummo. Ideóque poſt *Auſtros* noxii præcipuè *Terræ-motus.* Noctu *Auſter*, interdiu *Aquilo* vehementior. Et ab Ortu flantes diuturniores ſunt ab Occaſu flantibus. *Septentriones* impari ferè deſinunt numero—— SOL & auget, & comprimit flatus: auget Exoriens Occidenſque, comprimit Meridianus æſtivis temporibus. Itaque medio Diei aut Noctis plerumque ſopiuntur: qui aut nimio Frigore, aut Æſtu, ſolvuntur. Et imbribus *Venti* ſopiuntur.

Vulturnus (Anglicè *South-Eaſt* Wind) ſi à Serenâ Cœli parte cœperit flare, non durabit in noctem: at *Subſolanus* (*Eaſt*-Wind) in majorem partem noctis extenditur. Quiſquis erit *Ventus*, ſi fervidus ſentietur, pluribus diebus permanebit. *Aquilonem* (*North-Eaſt* Wind, for ſo PLINY conſtrues the Word *Aquilo*) prænunciat Terra ficceſcens repentè; *Auſtrum* (*South*-Wind) humeſcens rore occulto. i. e.

The South *Wind in* Africa *is ſerene, and the* North-Eaſt *Wind cloudy. All the* Winds *blow in their Turns. 'Tis the fourth Day of the Moon chiefly, that does rationally diſcover their Changes. 'Tis the* South-*Wind that is more boiſterous than the* North-Eaſt, *becauſe that ariſes from the Bottom of the Sea, this from the Top. Therefore after the* South-*Winds, the* Earth-quakes *are moſt noxious.*

The

The South-*Wind by Day, and the* North-East *Wind by Night are moſt vehement. And thoſe that blow from the* East, *are more laſting than thoſe that blow from the* West. *The* Northen *Winds do not always ceaſe at once——The* SUN *both encreaſes and ſtops their* Flatus: *It encreaſes it both at its Riſing and Setting; and ſtops it at Noon in the Summer-time. Therefore commonly thoſe* Northern *Winds are appeas'd at Mid-day or Mid-night; being quite put down either by too much Cold or too much Heat. And all* Winds *are appeas'd by Showers of Rain.*

The South-East *Wind, if that Part of the Sky be clear from whence it begins to blow, won't laſt all Night; but the* East-*Wind laſts moſt Part of the Night. Be it what* Wind *it will, if it be boiſterous, it will continue many Days. If the Ground dries on a ſudden, it foretels a* North-East *Wind; but a ſmall Dew upon the Ground is a Sign of a* South *Wind.* Thus far PLINY.

Common Obſervations on the WINDS in *Great-Britain,* are as follow;

The North-*Wind is cold,*
The North-East *colder.*
But when the Wind is full in the East,
It is good for neither Man nor Beaſt.
The South-*Wind often brings ſome Rain,*
The South-West *Wind brings more Rain.*
But when the Wind is West,
It is much the beſt.
When the Wind is ſtill,
The Weather is not ill.

Signs

Signs of Windy and Wet Weather from the SUN.

IF the SUN ariſes with an *Iris* or Circle about him with divers Colours, or that declines unto a fiery Redneſs; or if the Rays of the SUN darting thro' the Clouds be Red and Long, it is a Sign of Great *Winds*.

And if after the SUN's Setting in the *Weſt*, Red fiery Clouds ſhall appear, 'tis a ſure Sign of enſuing *Wind*.

Or if the SUN looks Red, or of an Orange-colour, ſome Time before its Setting, 'tis a Sign of enſuing *Wind*.

M. OZANAM ſays, an *Iris* or Circle round the SUN with a fair clear Air, is a Sign of *Rain*, but in the Time of Rain 'tis a Sign of Fair Weather.

Signs of Windy and Wet Weather from the MOON.

CORNU LUNÆ (ſays PLINY, *Nat. Hiſt.* L. xviii. c. 79.) *Septentrionale* acuminatum atque rigidum, illum præſagit *Ventum*: inferius *Auſtrum*: Utraque recta, Noctem *Ventoſam*. Si Quartam orbis rutilus cingit, *Ventos* & *Imbres* præmonebit.

VARRO's

VARRO's Opinion is this ——

Si Quarto die LUNA erit directa, magnam *Tempeſtatem* in Mari præſagiet, niſi Coronam circa ſe habebit, & eam ſinceram : quoniam illo modo non ante Plenam LUNAM hiematurum oſtendit.

Si *Plenilunio* per dimidium pura erit, dies *Serenos* ſignificabit : Si rutila, *Ventos :* nigreſcens, *imbres.*

Si caligo orbis nubem incluſerit, *Ventos*, qua ſe ruperit : Si gemini Orbes cinxerint, majorem *Tempeſtatem.* Et magis, ſi tres erunt, aut nigri, interrupti atque diſtracti ——

Si plena circa ſe habebit Orbem, ex quâ parte is maximè ſplendebit, ex eâ *Ventum* oſtendet : Si in Ortu *Cornua* craſſiora fuerint, horridam *Tempeſtatem.* Si antè Quartam non apparuit, *Vento Favonio* flante, Hyemalis toto Menſe erit. Si Decimo ſexto vehementius flammea apparuerit, *aſperas Tempeſtates* præſagiet.

Sunt & ipſius LUNÆ 8 Articuli, quoties in angulos SOLIS incidit, pleniſque inter eos tantum Obſervantibus Præſagia ejus ; *i. e.* Tertia, Septima, Undecima, Decima-quinta, Decima-nona, Vigeſima-tertia, Vigeſima-ſeptima, & Interlunium.

i. e.

The MOON's *Horn pointing towards the* North, *and being ſharp-pointed, foretels a* North *Wind : The lower Horn, the* South *Wind : When both of them are ſtrait and ſharp, they foretel a* Windy *Night. If the* MOON *be encompaſs'd with a bright ruddy Circle when ſhe is four Nights Old, ſhe foretels both* Windy *and* Showry *Weather :* ſays PLINY.

VARRO's Opinion is this ——

If the MOON, *when she is four Days Old, has her Horns sharp, she foretels a* Great Tempest at Sea, *unless she has a Circle about her, and that too Entire; because by that she shews that it is not like to be Bad Weather till 'tis* Full Moon.

If the MOON, *in her Full, be but Half clear, she foretels* Fair *Weather: If Bright and Ruddy, she foretels* Winds: *If Black,* Showers.

If the MOON *be included in a Cloudy Circle, it foretels* Wind *where it breaks forth: If she be included in two Circles, expect a* Greater Tempest: *and more still if there be three Circles, and those Black, Broken, and Dispers'd.*

If the MOON *has a Circle round about her at her* Full, *from what Quarter soever she shines most, from thence expect a* Wind. *If at her first Rising her Horns appear blunter, you may expect a* dreadful Tempest. *If the* MOON *don't appear till she is four Days Old, and the Wind be* Westward, *it will be* Bad Weather *all the Month. If the* MOON, *when she is sixteen Days Old, appears much inflam'd, it foretels* Severe Tempests.

There are 8 *Points of the* MOON, *whenever she happens to be at Right Angles with the* SUN, *and as many Observations to be made at those Times,* viz. 3, 7, 11, 15, 19, 23, 27. *and the* Interlunium; i. e. *the Space when neither the* New *Moon nor* Old *is seen.*

M. OZANAM says, An Iris or Circle round the MOON, is a Sign of *Rain* with a *South* Wind.

Signs

Signs of the WINDS *changing.*

WHEN the SUN rises with many pale Spots appearing in its Orb, and Part of it hid in a Cloud, the WIND (in what Point soever it be) will soon turn to the *South*.

When the WIND has been settled twenty-four Hours or more, in any of the full Points (as *North*, *East*, *West*, or *South*) when it begins to turn, it will not settle till it comes to the opposite Point, as from the *North* to the *South*, and so from full *East* to full *West*; and so of the Angular Points, as from the *North-East* to *South-East*.

Let the WIND be in what Quarter it will, upon the *New-Moon* it presently changes.

When the Generality of the Clouds rack, or drive with the *Wind* (tho' there are many in little Fleeces, or long Strakes, lying higher and appearing not to move) the *Wind* is flagging, and will quickly change and shift its Point.

Signs of TEMPESTS *arising.*

MY Lord BACON mentions these as Prognostics; *viz.* the Resounding of the Sea from the Shoar, and the Murmuring of the *Winds* in the Woods without any apparent Wind, shew *Wind* to follow. For such *Winds*, breathing chiefly out of the Earth, are not at the first perceiv'd, except they be pent by Water or Wood. And therefore a Murmur out of the Caves likewise portends as much.

So VIRGIL;

Continuo *Ventis* surgentibus aut freta Ponti
Incipiunt agitata tumescere, & aridus altis
Montibus audiri Fragor; aut resonantia longè
Littora misceri, & *Nemorum* increbescere Murmur.

i. e.

For e'er the rising Winds *begins to roar,*
The working Seas advance to wash the Shoar:
Soft whispers run along the leavy Woods,
And Mountains *whistle to the* Murm'ring Floods.

Again,

Sæpè levem *Paleam* & *Frondes* volitare caducas
Aut summâ nantis in Aquâ concludere *Plumas.*

i. e.

And Chaff *with Eddy* Winds *is whirl'd around,*
And dancing Leaves *are lifted from the Ground,*
And floating Feathers *on the Waters play.*

Hence

Hence PLINY almoſt Verbatim:

Equidem & *Montium* ſonitus, *Nemorumque* Mugitus prædicunt: & ſine Aurâ quæ ſentiatur, *Folia* ludentia. *Lunago Populi* (Ang. Poplar-tree) aut Spinæ, volitans: Aquis *Pluma* innatans. Atque etiam in Campis *Tempeſtatem* venturam præcedens ſuus fragor.

And thus HORACE, Od. xvii. B. iii.

——— Cras *Foliis* Nemus
Multis, & algâ Littus inutili
Demiſſa *Tempeſtas* ab *Euro*
Sternet, Aquæ niſi fallit Augur
Annoſa CORNIX———

i. e.

To-morrow furious WINDS *ſhall ſpread*
The troubl'd Shoar with uſeleſs Weed,
And fill the Woods with ſcatter'd Leaves,
Unleſs the Cawing CROW *deceives,*
The CROW *that ſtill foretels a* Rain
And Storm, *and never Caws in vain.*

The AIR and FIRE (ſays my Lord BACON) have ſubtil Perceptions of the *Wind ariſing*, before Men find it. We ſee the Trembling of a *Candle* will diſcover a *Wind* that otherwiſe we do not feel; and the flexious Burning of *Flames*, ſhews the Air is beginning to be unquiet; and ſo do *Coals of Fire*, by caſting off the Aſhes more than uſual. The Reaſon is, becauſe no *Wind* at firſt, till it has agitated the *Air*, is apparent to the Senſe; but *Flame* is eaſier to move than *Air*. And for the *Aſhes*,

Ashes, 'tis no wonder if *Wind* unperceiv'd shake them off, for we usually try which Way the *Wind* blows by casting up *Grass* or *Chaff*, or such light Things into the *Air*— Thus far my Lord BACON: which seems to be nothing else but a Translation out of VIRGIL and PLINY:

Nec nocturna quidem carpentes pensa Puellæ
Nescivere *Hyemem*; testâ cum ardente viderent
Scintillare *Oleum*, & putris concrescere *Fungos*.
i. e.
The Nightly Virgin, while her Wheel she plies,
Foresees the Storm *impending in the Skies,*
When sparkling Lamps *their* Sputt'ring Light *advance,*
And in the Sockets Oily Bubbles *dance.*

And PLINY more fully:

TERRENI IGNES significant: *Pallidi* namque *Murmurantesque*, *Tempestatem* nuncii sentiuntur. Pluviæ etiam in *Lucernis Fungi*. Si *flexuosæ* volitet *Flamma*, Ventum. Et *Lumina* cum ex se Flammas elidunt, aut vix accenduntur. Item cum in eo pendentes coacervantur *Scintillæ*: vel cum tollentibus ollas *Carbo* adhæresit: aut cum contectus IGNIS à se *Favillam* discutit, *Scintillamque* emittit: vel cum *Cinis* in foco concrescit, & cum *Carbo* vehementèr perlucet. i. e.

TERRENE FIRES *have their Signification: for your* Pale *and* Murmuring FIRES *are Forerunners of* Storms. *The very Snuff of a* Candle *will foretel* Rain. *The trembling* Flame *prognosticates* Wind. *And* Lamps *when they go out of themselves, or are hard to be lighted.*

When

When small Sparks of Fire *fly off very plentifully. Or when dead* Coals *stick to the Bottom of Pots when they are taken off the Fire. Or when conceal'd* Fire *shakes off its dead Ashes, and sends out live Sparks. Or when extinguish'd* Cinders *begin to reinkindle, and dead* Coals *revive.*

The Reverend and Ingenious Mr. *Robinson* (in his *Nat. Hist.* of *Westmorland*, p. 7, *&c.*) gives us this Account of the Origin of *Wind* —— That, in the greatest Probability, it proceeds from vast Swarms of Nitrous Particles arising from the Bottom of the Sea, which being put into Motion, either by the Central Fire, or by that Heat and *Fermentation* which abounds in this Great Body of the Earth: And therefore this first Commotion, excited by the said Fermentation, we call *A Bottom-Wind*, which is presently discover'd by *Porpices* and other Sea-Fish, which delight in Sport and Play upon the Waves of the Sea; who by their Playing give the Mariners the first Notice of an approaching *Storm.* When these Nitrous Swarms are risen towards the Surface of the Sea, in a dark Night, they cause such a *Shining Light* upon the Waves, as if the Sea were on Fire, and being deliver'd from

from the brackish Water, and receiv'd into the Open Air, those Fiery and Shining Meteors which fix upon the Masts and Sides of the Ships, and are only Nitrous Particles condens'd by the circumambient Cold, and like that which the Chymists call *Phosphorus* or Artificial *Glow-worm*, shine and cast a Light, but have no Heat: This gives to Mariners the second Notice that the *Storm* is rising; for upon the first breaking out of the *Wind*, the Sea begins to be rough, and Waves swell and rise, when at the same Time the Air is calm and clear.

This boiling *Fermentation* of the Sea causes the Vapours to arise, which by the Intenseness of the Circumambient Cold, is condens'd into thick Clouds, and falls down in Storms of *Wind* and *Rain*, first upon the Sea from whence they rose, and then the attractive Power of the Mountain-Cold, by a secret Magnetism, between Vapour and Cold, attracts the Waterish Vapours, intermixt with Nitrous Particles, to the High Tops of Mountains and Hills, where they hang hovering in thick Fogs and Waterish Mists, until the Atmospherical

rical Heat rarifies the Nitrous Part of the Fog (which is always uppermoſt, and appears white and tranſlucent) into brisk Gales of *Wind*; and the Intenſeneſs of Atmoſpherical Cold, having attracted the Vapours into the Colder Regions of the Air, where, being condens'd into Clouds, the *Wind* breaks, diſſipates, and drives them before it, till they fall down in *Rain*, and water the Surface of the Earth: and this ſeems to be the Reaſon why in *Ægypt* and thoſe level Countries, where they have no Mountains, they have little *Wind*, and leſs *Rain*. Thus far this Ingenious Author. And no doubt but the very ſame Obſervations may be made upon Eruptions from the Caverns of the Earth, as well as the Sea.

What ſeems to countenance this Author's Opinion, is a late Account of a *Phænomenon* in the Sea (mention'd in Mr. *Read's Journal*, N° 1885.) related by a Relation of this Author, which is as follows —— A Prodigy has lately-happen'd about the Iſland of *Tercera* (an Iſland of the *Atlantic Ocean*, the Chief of the *Azores*) ſeventeen Leagues diſtant S. E. from it,

about the 20th of *November*, in the Year 1720, by *Fires* which break out on the Surface of the Sea, with a most violent Impetuosity, throwing up Pumice-stones and other Cumbustibles, and has form'd an *Island* of three Leagues long and as many broad, having considerable Height, and Mountainous, with five *Vulcano's*, making a most hideous Noise like Thunder or Great Guns, and a *Cloud* proceeding from it, breaking into small *Rain* of *Sand* instead of Water, and smelling like Brimstone—— This astonishing Irruption caus'd a great *Earthquake* in the said *Island*, which threw down a great many Houses in the City of *Angra* and the adjacent Parts. And in *May* following it was still burning with *Fire* and *Smoke* and roaring Noise.

Signs of arising Tempests, from the SUN, MOON, *and* STARS.

IF at SUN-rising pale Spots seem to appear in its Orb, and dazzle there, strong *Winds* will ensue from the *South*, the Wind soon shifting to that Point in whatever Quarter it was before.

If

If there appear fiery Spots, or thoſe of a Reddiſh Colour, in the SUN upon its Setting, much *Wind* will enſue ſpeedily. And oftentimes a Red lowring Morning is the Forerunner of *Wind.*

If the MOON bluſhes, and is Redder than uſual, *Winds* are engendering, and *Storms* will ariſe.

Alſo a Reddiſh Circle about the MOON at the Full, denotes *much Wind.*

Another Sign of ariſing *Tempeſts*, is when the Brightneſs of the ſmaller STARS is on a ſudden obſcur'd: For the Upper Regions of the Air perceive the Collection of the Matter of *Tempeſts* and Winds before the Air here below. *Cæli quidem Murmur non dubiam habet ſignificationem*, ſays PLINY. And therefore the Obſcuring of the Smaller STARS, is a Sign of *Tempeſts* following. (*Vid.* Lord BACON's *Inquiſitio de Ventis.*) Thus again PLINY—*Cum repentè* STELLARUM *Fulgor obſcuratur, & id neque nubilo, neque caligine*, Pluvia *aut graves denunciantur* Tempeſtates.

Alſo METEORS (or, as Common People call them, STARS-ſhooting) ſpreading a

long Train of Light, fore-run *Winds* that will soon ensue. Thus VIRGIL;

Sæpè etiam STELLAS, Vento impendente, videbis,
Præcipites Cœlo labi, Noctisque per Umbram
Flammarum longos à tergo albescere tractus.

i. e.

And oft before Tempestuous *Winds arise*
The Seeming-STARS *fall headlong from the Skies,*
And shooting thro' the Darkness, gild the Night
With sweeping Glories, and long Trails of Light.

Hence PLINY;

Discurrere STELLÆ videntur interdum, *Ventique* protinùs sequuntur, in quorum Parte ita præsagivere.

Si volitare plures STELLÆ videbuntur, quo feruntur albescentes, *Ventos* ex iis Partibus nunciabunt.

Aut si cursitabunt, certos: Si id in pluribus Partibus fiet, inconstantes *Ventos* effundent.

Signs of arising Tempests from the CLOUDS *and* SEA.

SMALL scatter'd CLOUDS in the *South-West*, that fly High, lie as it were in Ridges, and seem not to move, engender *Winds*, often producing *Whirlwinds.*

PLINY (*Nat. Hist.* L. xviii. c. 79.) says, NUBES cum sereno Cœlo feruntur, à quâcunque Parte id fiet, expectentur *Venti:* Si eodem loco globabuntur, appropinquante SOLE discutientur. Et hoc si ab *Aquilone* fiat, *Ventos:* Si ab *Austro, imbres* por-

portendent. SOLE Occidente ſi ex utraque Parte ejus Cœlum petent, *Tempeſtatem* ſignificabunt.

Eſt & AQUARUM ſignificatio. *Mare* ſi tranquillum in portu à curſu ſtabit, & murmuraverit intra ſe, *Ventum* prædicit. Littora Ripæque ſi reſonabunt tranquillo, *aſperam Tempeſtatem:* Item *Maris* ipſius tranquillo ſonitus, Spu-mæ-ve diſperſæ, aut Aquæ bullantes. Sæpè & ſilentio intumeſcit *Mare*, flatuque altiùs ſolitò jam intra ſe eſſe *Ventos* fatetur.

i. e.

When CLOUDS *move about in a clear Sky, from what Quarter ſoever they come, you may expect* Winds. *If they gather together in the ſame Place, they will be diſpers'd by the approaching* SUN. *And if theſe* CLOUDS *come out of the* North-Eaſt, *they foretel* Wind: *But out of the* South, Rain. *But if they come from either Quarter at* Sun-ſet, *they foretel a* Tempeſt.

The WATERS *likewiſe as well as the* Skies, *afford us Prognoſtications of the Weather. If the* Sea-*Shoar be calm, and the Main troubled, it foretels* Wind. *But if the Shoars be troubled whilſt there is a Calm at* Sea, *it foretels a* Severe Tempeſt, *as does the Noiſe of its Waves in a Calm, its Foam, and Bubbles. The* Pulmones Marini (*tho' accounted Senſeleſs Fiſhes*) *give Notice to Mariners of approaching* Storms *that will laſt ſeveral Days. Often-times the* Sea *begins to be rough, and the Waves ſwell and riſe even in a Calm, and there is a briſker Gale of Wind ſtirring than ordinary, which ſhews that there is a* Tempeſt *ariſing.*

Give me leave here to add another Sign of *Tempeſts* ariſing, and that is the Murmuring Noiſe of THUNDER from the *North,* *Signs*

Signs of Tempeſts Ceaſing.

A Haſty Shower of Rain falling when the *Wind* has rag'd for ſome Hours, ſoon allays it.

If the Water ruckles much, and frequent Bubbles ariſe, the *Storm* is of a ſhort Continuance.

If the Bird, call'd the *Halcyon* or *Kingfiſher*, attempts the Seas when the *Wind* blows hard, 'tis a Sign of its abating.

The merry Chirriping of *Sparrows*, and *Moles* coming out of their Holes, are Signs of *Storms* ceaſing.

Signs of THUNDER *and* LIGHTNING.

IT has been the Obſervation of thoſe that have had many Years Experience of the Weather, that when the *Wind* in the Summer Time has been *South* two or three Days together, and it grows very Hot; and when you ſee *Clouds* ariſe with great White Tops like Towers, as if one *Cloud* were on the Top of another, and join'd together with Black on the Nether Side, that then it is like to be THUNDER and RAIN ſuddenly in many Places.

If

If there ariſe two ſuch *Clouds* with *Thunder* in them, the one on the one Side of you, and the other on the other, then beware.

Another Sign of approaching *Thunder*, are *Meteors* ſhooting in the Night in Summer-time, for they ſhew the Air to be inflam'd with much Heat, and conſequently that *Thunder* and Lightning will enſue.

Likewiſe many *Chops* and *Clefts* in the Ground, ſhew that abundance of Nitrous and Sulphureous Vapours have been exhal'd from the Earth, and got up amongſt the Clouds, and there being impatient of Reſtraint, after long ſtruggling, and rumbling, at laſt take Fire and burſt through with a great Noiſe, which we call THUNDER, and a ſudden Flaſh which we call LIGHTNING, which are both inſtantaneous, tho' the one is Seen before the other is Heard, becauſe the Senſe of Seeing is quicker than that of Hearing.

If no *Clouds* appear in ſultry Weather, and the SUN ſets Red and Fiery, great Flaſhes will appear in the *North* and *North-Weſt*, which is call'd *Fulgetrum*, or *Lightning without Thunder*; becauſe meeting

meeting with no Oppoſition, tho' ſpringing from the ſame Cauſe, the Noiſe is not heard. PLINY ſays,

Cum Æſtate vehementiùs tonuit quàm fulſit, *Ventos* ex eâ parte denunciat: Contra, ſi minùs tonuit, *Imbrem.* Cum ſereno Cœlo *Fulgetræ* erunt & *Tonitrua*, adhiemabit. Atrociſſimè autem, cum ex omnibus quatuor Partibus Cœli *fulgurabit.* Cum ab *Aquilone* tantùm, in poſterum Diem *Aquam* portendit. Cum à *Septentrione*, *Ventum* eum. Cum ab *Auſtro*, vel *Coro*, aut *Favonio*, Nocte Serenâ fulguraverit, *Ventum* & *Imbrem* ex iiſdem Regionibus demonſtrabit. *Tonitrua* matutina *Ventum* ſignificant, *Imbrem* Meridiana.

i. e.

When in the Summer-time it Thunders *more than Lightens, from that Quarter you may expect* Winds: *On the Contrary, when it* Thunders leſs, *you may expect a* Shower. *When in a Quiet Air it both* Thunders and Lightens, *it will be* Bad Weather: *But very Bad when the* Lightning *comes from all the four Quarters of the Sky. When it comes only from the* North-Eaſt, *it foretels* Rain *the next Day. When it comes from the* North, *it foretels a* North Wind. *When in a Quiet Night the* Lightning *comes out of the South,* North-Weſt, *or* Weſt, *it foretels both* Rain *and* Wind *from thoſe Quarters.* Thunder *in a Morning foretels* Wind; *at Noon*, Rain.

VIRGIL,

At *Boreæ* de parte trucis cum *Fulminat*, & cum
Eurique Zephyrique tonat Domus; Omnia plenis
Rura natant foſſis, atque omnis Navita Ponto
Humida vela legunt ———

i. e. *But*

i. e.

But when the winged THUNDER *takes his Way*
From the cold North, *and* East *and* West *engage,*
And at their Frontiers meet with equal Rage,
The Clouds are cruſh'd, a Glut of gather'd Rain
The hollow Ditches fills, and floats the Plain,
And Sailors furl their dropping Sheets amain.

Now the Cauſe of *Thunder and Lightning* aſſign'd by Dr. WALLIS (*Philoſ. Tranſ.* N° 231. p. 655.) is as follows — *Thunder and Lightning* (ſays he) are ſo very like the Effects of fir'd *Gun-powder*, that we may reaſonably judge them to proceed from like *Cauſes*. The principal Ingredients in *Gun-powder* are *Nitre* and *Sulphur* (the Admiſſion of Charcoal being chiefly to keep the Parts ſeparate for the better kindling of it). So that if we ſuppoſe in the Air, a convenient Mixture of *Nitrous* and *Sulphureous* Vapours, and thoſe by Accident to take Fire, ſuch Exploſion may well follow, with ſuch Noiſe and Light, as in the firing of *Gun-powder*. And being once kindled it will run from Place to Place as the Vapours lead it, as in a Train of *Gun-powder*, with like Effects.

This *Exploſion*, if High in the Air, and far from us, will do no Miſchief, or not conſiderable; like a Parcel of *Gun-powder* fir'd in the open Air, where is nothing near to be hurt by it: But if near to us (or amongſt us) it may kill Men or Cattle, tear Trees, fire Gun-powder, break Houſes, or the like; as Gun-powder wou'd do in like Circumſtances. This Nearneſs or Farneſs may be eſtimated by the Diſtance of Time between Seeing the Flaſh of *Lightning*, and Hearing the Noiſe of *Thunder*. For tho' in their Generation they be Simultaneous; yet (Light moving faſter than Sound) they come to Us ſucceſſively. I have obſerv'd that commonly, the *Noiſe* is about 7 or 8 Seconds after the *Flaſh* (*i. e.* about Half a Quarter of a Minute); but ſometimes much ſooner, in a Second or two, or leſs than ſo, and almoſt immediately upon the *Flaſh*. And at ſuch Time, the *Exploſion* muſt needs be very near us, or even amongſt us. And in ſuch Caſes, I have (more than once) preſag'd Miſchief, and it has happen'd accordingly.

Now,

Now, that there is in *Lightning* a *Sulphurous* Vapour is manifeſt from the *Sulphurous* Smell which attends it, and a Sultry Heat in the Air which is commonly a Forerunner of Lightning ſoon after. And that there is alſo a *Nitrous* Vapour with it, we may reaſonably judge, becauſe we do not know of any Body ſo liable to a ſudden and violent *Exploſion*.

Clouds like *Woolly* Fleeces appearing High, and moving Heavily, having in the Middle a Darkiſh Pale, and the Edges White, carry SNOW in them, which in Winter frozen in Sheets by Cold *Eaſt*, *North-Eaſt*, and *North-Weſt* Winds, preſſing hard on the Atmoſphere (no longer able to bear them up) ſhiver in the Fall and break into Flakes. If the *Clouds* be preſs'd nearer the Earth, the Vapours ſo frozen are groſſer, and the Flakes larger; but more remote, thinner, and ſo fall in little Flakes.

The SUN's looking Pale at its Riſing; the much Lowing of CATTLE in the Fields; the Croaking of RAVENS; and BIRDS flagging their Wings, are all Signs of approaching SNOW.

Mr. MORTON in his *Nat. Hiſt. of Northamptonſhire*, p. 348, ſays, that there are ſome previous Alterations in the lower Part of the Air upon the Approaches of a *Thunder*-Cloud, as there are before Rain and Snow; tho' we have not any Weather-Glaſſes invented to diſcover them, we are aſſur'd by the nicer Senſe and Sagacity that is in ſome Brute Animals, and particularly in ſome of our Horſes, which before a *Thunder*-Cloud diſcharges, will often ſhake their Heads, turn about with great Uneaſineſs; but when the Clap is over, they are Eaſy as before.

Signs of HAIL.

IF the SUN at its Riſing caſt a glittering Light as if it reflected on ſome Lucid Matter, tho' few or no Clouds appear at that Time; the Vapours are condens'd in the Cold Region, and forerunning into Clouds that will ſcatter violent HAIL.

If (in the Morning) the *Eaſtern* Skies, before the SUN-riſing, look Pale; and refracted Rays appear in thick Clouds, great Storms of HAIL will enſue to the great Damage of Corn and Fruits.

Thus

Thus VIRGIL;

Aut ubi ſub Lucem denſa inter Nubila ſeſe
Diverſi rumpent Radii, aut ubi *pallida* ſurget
Tithoni croceum linquens *Aurora* cubile;
Heu, malè tum mitis defendet *Pampinus* Uvas,
Tam multa in *Tectis* crepitans ſalit horrida GRANDO.

i. e.

Or if Aurora *with Half-open'd Eyes,*
And a Pale ſickly Cheek, ſalute the Skies,
How ſhall the Vine, *with tender Leaves defend*
Her teeming Cluſters, when the Storms *deſcend,*
When riddy Roofs *and* Tiles *can ſcarce avail*
To bar the Ruin of the ratling HAIL.

PLINY ſays,

Si Cacumina Montium gravida fient, Nube candicante (quod vocant *Tempeſtatem Album*) GRANDO imminebit.

If the *Clouds* look Fleecy, Dusky, White inclining to Yellow, and move but Heavily, tho' the Wind be pretty Rough, the Vapours compoſing them are engender'd and frozen, and ratling HAIL enſues.

If the *Clouds* appear of a *Whitiſh Blue*, and expand much, it will be ſmall HAIL or Driſling (*i. e.* frozen Miſts); for that happens in the Winter or Spring, when it cannot be carried High enough to be condens'd by a greater Quantity of Cold, becauſe the refracted Rays of the SUN are but

but weak, and this appears by a Curdling in the *Clouds* as they Riſe, and in Appearance expand themſelves.

White Clouds in the Summer-time are a Sign of HAIL, but in Winter-time they are a Sign of SNOW, eſpecially when we perceive the Air to be a little Warm, occaſion'd by ſome Warm Eruptions out of the Clouds.

The Reverend and Learned Mr. SAUL (in his Hiſt. and Philoſoph. Account of the Barometer) gives this ingenious Account of the Formation of SNOW and HAIL, p. 23. —— Out of the Magazines of Vapours floating and ſupported in the Air (according to the different Changes they undergo from the Seaſon of the Year, the Temper of the Winds, and the Warmth or Coldneſs of the Superior Regions) the ſeveral Kinds of Aqueous Meteors are form'd and ſupplied, which under ſo many different Appearances fall back upon the Surface of the Earth. Such Vapours as are rais'd by the declining SUN, or hang near the Surface of the Earth, being condens'd by the Coldneſs of the Nights, in the Summer fall back in Dews, and in the

the Winter in *Hoar Froſts*. In what we call a *Black Froſt*, either the Riſe of Vapours is quite intercepted, or rather they are rais'd too High to be reach'd and precipitated by the Cold below. When the Vapours approaching nearer to each other, are frozen in the Clouds, and broken by the Reſiſtance and Fluctuations of the Air, or the Cold Winds paſſing thro' them, they then fall down in Flakes of SNOW. When the Vapours are beginning to run into ſmall Drops, and are precipitated by the Cold Above, before they are compleatly form'd, they then fall down in *Miſling Rains*, or if frozen, in *Sleet*. And as the ordinary Drops of *Rain*, freezing in their Deſcent, form HAIL; ſo whenever they happen afterwards in their further Deſcent downwards, to paſs thro' a Cloud of SNOW, they encreaſe in Bulk, and gathering, in a Literal Senſe, as a *Snow-ball*, form thoſe larger *Hail-ſtones* (of ſix or more Inches in Circumference) of which we often read, and ſometimes with Surprize Admire and Obſerve.

Now

Now as to the Cauſe or Generation of HAIL (which is very often an Attendant of *Thunder* and *Lightning*) Dr. WALLIS (in *Philoſ. Tranſ.* N° 231. p. 657) gives us this Account — 'Tis well known (ſays he) in our Artificial Congelations, that a Mixture of *Snow* and *Nitre* (or even common Salt) will cauſe a preſent and very ſudden *Congelation of Water*. And the ſame in Clouds may cauſe that of *Hail-ſtones*. And the rather, becauſe there ſeems ſomewhat like *Snow*, rather than *Ice*, in the midſt of them. And as to thoſe in particular ſo very large (as to weigh Half a Pound, or three Quarters of a Pound) ſuppoſing them to fall from ſo great a Height, as 'tis manifeſt they did by the Violence of their Fall; 'tis very poſſible, that, tho' their firſt Concretion, upon their ſudden *Congelation*, might be but moderately Great as in other *Hail*, yet in their long Deſcent, if the Medium thro' which they fall were alike inclin'd to *Congelation*, they might receive a great Acceſſion to their Bulk, and divers of them incorporate into one.

Signs

Signs of Cold and Frosty Weather.

THE SUN's Setting Red in a Mist, and broader than usual, and a White Fog creeping low in Marshy Ground, shew the Air is condensing into *Cold.*

The MOON shining Bright, with sharp Horns after the Change, shews the Air is rarifying, and that Cold Winds will soon set in to freeze the Earth.

Also the STARS looking Bright and twinkling much, denote a Cold Air, engendering *Frosts.*

The *Sky* seeming fuller of STARS than usual, and the Wind suddenly shifting to the *East*, or *North-East*, after the Change of the *Moon*, in the Winter, denotes a settling FROST of long Continuance.

Sea-Pyes flocking from Salt to Fresh Waters; also *Starlings*, *Feldefares*, and other Birds of a Hot Nature, hast'ning in great Flocks from the *Northern* to the *Southern* Climates; and *Swallows* going away sooner than usual, denote a *Cold Season* to ensue.

Thus Mr. DRYDEN in his *Hind and Panther*;

The Swallows (*privileg'd above the rest*
Of all the Birds, *as Man's familiar Guest*)
Pursue the SUN *in Summer brisk and bold,*
But wisely shun the persecuting Cold.
When frowning Skies begin to change their Chear,
And Time turns up the wrong Side of the Year,
They seek a better Heav'n and warmer Climes.
But whether Upward to the MOON *they go,*
Or dream the Winter out in Caves Below,
Or hawk at Flies elsewhere, concerns us not to know.

Owls Hooping Often with a Lowder Note than usual, in the Winter-time, signify approaching FROST.

Likewise Little *Clouds* hovering Low in the *North*, when none appear any where else, fore-run *Cold freezing Winds* and *Snow*. PLINY says,

Arcus cum sunt duplices, *Pluvias* nunciant: à *Pluviis*, *Serenitatem* non perindè certam.

Circuli novi circa *Sidera* aliqua, *Pluviam.*

i. e.

The Rain-bows *being of two Sorts, foretel* Rain: *But from* Rain *you can't so easily prognosticate* Fair Weather.

New Circles about some of the Stars, *are Signs of* Rain.

The SUN's looking Waterish at its Rising, is one Sign that the FROST will *break*. Also

Alſo the SUN's Setting in Bluiſh Clouds, and caſting refracted Rays into them is another.

The STARS looking Dull upon the Matter, and the MOON's Horns blunted, bid the FROST prepare to be gone.

The WIND having held long, and extremely ſhifting, brings a Relaxation, if not a thorough *Thaw*.

When the AIR is either intenſively Cold, or intenſively (*i. e.* exceſſively) Hot, 'tis ſeldom laſting: Therefore when the *Air* in the Summer-time is intenſively Hot, we ſay, *It is too Hot to Hold:* So likewiſe when the *Air* in the Winter-time is intenſively Cold, we may ſay, *'Tis too Cold to Hold:* Becauſe *Nullum Violentum eſt diuturnum, Nothing that is Violent is laſting*.

Signs of Hard Winters.

LORD BACON's Prognoſticks of Hard Winters, are as follow:

The Predictions of Cold and Long *Winters*, and Hot and Dry *Summers*, are good to be known, as well for the

Diſcovery of the Cauſes, as for divers Proviſions. If *Wainſcot* or *Stone*, that have been uſe to *Sweat* (as they call it) be more Dry in the Beginning of *Winter*, or the Drops of Eaves of Houſes come down more ſlowly than they uſe to do, it portends a *Hard and Froſty Winter*. The Cauſe is, for that it ſhews an Inclination of the Air to Dry Weather, which in *Winter* is ever join'd with *Froſt*.

Generally a *Moiſt and Cold Summer* portends a *Hard Winter*. The Cauſe is, for that the Vapours of the Earth are not diſſipated in the Summer by the SUN, and ſo they rebound upon the Winter.

A *Hot and Dry Summer*, and eſpecially if the Heat and Drought extend far in *September*, portends an Open Beginning of Winter, and Cold to ſucceed towards the latter Part of the Winter, and the Beginning of the Spring. For till then the former Heat and Drought bear the Sway, and the Vapours are not ſufficiently multiply'd. PLINY ſays,

Autumni Serenitas Ventoſam Hyemem facit.
i. e.
A Mild Autumn *foretels a Hard* Winter.

But

But an Open and Warm *Winter* portends a Hot and Dry *Summer* : For the Vapours disperse into the Winter Showers ; whereas Cold and Froft keep them in, and transport them into the late Spring and Summer following.

Cold Dews, and Morning *Rymes* about St. *Bartholomew-tide*, and *Hoar-Frosts* in the Morning about *Michaelmas-tide*, foretel a *Hard Winter*.

Other Signs of a *Hard Winter* may be fetch'd from the CLOUDS and STARS.

Thus PLINY ;

Si antè SOLIS-Ortum NUBES globabuntur, *Hyemem Asperam* denunciabunt.

Sunt in *Signo Cancri* duæ STELLÆ parvæ, *Asselli* appellatæ, exiquum inter illas spacium obtinente *Nubeculâ* quam *Præsepe* appellant : Hæc cum Cœlo sereno apparere desierit, *atrox Hyems* sequitur. Si alteram earum *Aquiloniam* caligo abstulit, *Auster* sævit : Si *Austrinam*, *Aquilo*.

i. e.

If the CLOUDS *gather before* SUN-*Rising*, *they foretel a* Hard Winter.

There are in the Sign of Cancer *two little* STARS *call'd* Asselli, *and a little* CLOUD, *that they call* Præsepia, *takes up a small Space between them : This* CLOUD, *when it disappears in a clear Sky, is a Sign of a* Hard Winter. *If one of those little* STARS *that points towards the* North *be obscur'd, the* South-*Wind will*

will be boiſterous: If the other that points towards the South *be obſcur'd, then the* North-*Wind will be boiſterous.*

Other Signs of a *Hard Winter* we have from BIRDS. *Migratory Birds*, that uſe to change Countries at certain Seaſons, if they come Earlier, do ſhew the Temperature of Weather according to that Country from whence they came: as the *Winter* BIRDS (namely *Woodcocks*, *Feldefares*, *Snipes*, &c.) if they come Earlier, and out of the *Northern* Countries, with us foretel *Cold Winters*. And if it be in the ſame Country, then they ſhew a Temperature of Seaſon like that Seaſon from which they come, as *Swallows*, *Nightingales*, *Cuckoes*, *Marlots*, and *Batts*, that come towards Summer, if they come Early, foretel a Hot Summer.

It is an Obſervation among Country People, That thoſe Years, in which we have Store of *Heps* and *Haws*, do commonly portend *Cold Winters*; and they aſcribe it to *Providence*, that reaches to the Preſervation of *Birds* in ſuch Seaſons. The Natural Cauſe alſo may be the Want of Heat and Abundance of Moiſture

in

in the precedent Summer, which puts forth thoſe Fruits, and muſt needs leave great Quantity of Cold Vapours not diſſipated, which cauſes the Cold of the enſuing *Winter*.

Some People make their Obſervations from NUT-TREES: If in the Beginning of the Year they Flower much, it foretels a Plentiful Harveſt, Sickly Autumn, and a *Cold Winter*.

Other nice Prognoſticators make their Obſervations from what they call OAK-APPLES, which are the Galls and Balls or Excreſcences found on the Leaves and Branches of divers Vegetables, ſuch as the Oak, the Willow, and the Briar; and alſo on ſome Plants, as Nettles, Ground-Ivy, *&c.* Theſe *Balls* are a Repoſitory to a particular Sort of Inſect all the Winter in its Infant Vermicular State; for the Eggs laid up and hatch'd the Summer before, do not come to mature Inſects till the Spring following. In the *Autumn* theſe *Balls* fall down with their Leaves to the Ground, and the Inſect inclos'd in them is there fenc'd againſt the Winter Froſts: And then is the Time for making Obſervations. If they

they are found to be Dry, they are said to foretel a Dry *Winter*; if Moist, a Wet *Winter*; if early Ripe, a very *Sharp Winter* will quickly follow. But if you cut these *Balls* and find no Insects within, it denotes a Scarcity of the Fruits of the Earth the ensuing Year. For commonly a great *Fly*-Year proves a great *Fruit*-Year, both being owing to the kind Influence of the SUN, which by its Congenial Warmth both brings to Perfection the Eggs of Insects, and brings to Maturity the Fruits of the Ground.

I shall mention but one more Observation and Prognostic of a *Hard Winter*, and that is your *Igneous* METEORS, call'd *Ignes Fatui*. These are weak Exhalations kindled by a violent Motion in a Cold Night, embodied as it were in Bladders, receiving their Motion from that of the Air; so that when these Nocturnal Luminaries, moving in the Lowest Regions of the Air, meet with any Man, they are apt to follow his Motions, and so lead him out of the Way, and therefore call'd *Ignes Fatui*, because they make *Fools* of People.

Now

Now when theſe Exhalations riſe much, which they do in Marſhy Grounds, towards the Beginning of Winter, they foretel a *Hard Winter*, but a *fruitful Summer*, becauſe the Hovering of theſe *Meteors* near the Earth, ſhews that the Air is condenſing and growing cold, which Coldneſs hinders the Aſcenſion of the Vapours, and keeps the Earth warm in the Winter, by incruſtating its Superficies with gentle Froſts, and as it were carefully locking up its Unctious, Nitrous, and Fertile Parts, and keeping them from Evaporation.

Signs of Peſtilential Seaſons.

HIPPOCRATES ſays, If the Year prove to be for the moſt part *Dry*, acute Fever muſt be expected. The Reaſon of which is plain, for by exceſſive Dry Weather, the Body is drained of its natural Moiſture, ſo that nothing remains behind but Viſcid and Dry Humours, unfit for Circulation. The *Tubuli* of the Skin are parch'd up, and Perſpiration hinder'd, whence proceed innumerable Diſtempers, Inflammations and acute Fevers.

If the *Winter* Seaſon (ſays the ſame Author) be *Dry* and *Cold*, and the Spring *Rainy*, and ſubject to *Southerly* Winds, it muſt neceſſarily fall out that in Summer, acute Fevers, Rheums in the Eyes, and bloody Fluxes happen, eſpecially to thoſe who are of a Moiſt Conſtitution. The Reaſon of which is this, By great Drineſs and Cold, the Secretory Ducts are contracted, and the Liquids grow viſcid, becauſe Perſpiration is hereby hinder'd. For too great Cold hinders Perſpiration, and contracts the Fibres as much as too great Heat. Which Viſcidity, being diſſolv'd and fomented by the ſupervening Moiſt Seaſon, is diſpos'd to Putrefaction.

But if the Winter be *Southerly*, *Hot*, and *Rainy*, and the Spring *Northerly* and *Dry*, then it is often an Occaſion of Abortions in Women, or elſe the Production of Weak and Diſeas'd Children: To others an Occaſion of Bloody-Fluxes, and Inflammation of Eyes: And to Old People, Rheums and Catarrhs, which ſhortly kill them. For by ſuch an unſeaſonable Warmth and Rain, the Bodies, eſpecially of Women, are render'd Lax, Heavy and Infirm.

And

And this is the Reaſon why ſuch a Seaſon is ſo pernicious both to very Young and Old People. But Middle-ag'd People may overcome it, by the Help of their ſtrong Conſtitution to digeſt ſuch Viſcid and Putrid Humours, as are occaſion'd by ſuch a Heavy Air.

If the Summer be *Dry* and the Wind *Northerly*, but the Autumn *Rainy*, and the Wind *Southerly*, then violent Pains in the Head, Coughs, Hoarſneſs, and Rheums, and to ſome Conſumptions, are to be expected in the Winter following. For by the Cold of the Summer and Heat of Autumn, Human Bodies grow Coſtive, Perſpiration is obſtructed, and in Time the Upper Parts of the Body, eſpecially the Head, are over-charg'd with Viſcid Humours, which are the Cauſes of ſuch Diſtempers of the Head and Lungs.

My Lord BACON ſays, it has been obſerv'd, that thoſe Years are Peſtilential and Unwholeſome, when there are great Numbers of *Frogs*, *Flies*, and *Locuſts*, &c. The Cauſe is plain, for that thoſe Creatures being ingender'd of Putrefaction, when they abound they ſhew a great Diſ-

poſition of the Air to breed Diſeaſes. But here this Great *Naturaliſt* err'd; for Spontaneous and Equivocal Generation is a Doctrine long ſince exploded. *Omnia ex Ovis*; No Animals but from Eggs. Putrefaction has no Seeds of Life in it ſelf, How then can it give Life? *Nil dat quod in ſe non habet.*

He tells us likewiſe, that it was obſerv'd in the Great *Plague* in 1665, that there were ſeen in divers Ditches and Low Grounds about *London*, many *Toads* that had Tails two or three Inches long at leaſt, whereas *Toads* uſually have no Tails at all; which argues a great Diſpoſition to Putrefaction in the Soil and Air. Here I ſuppoſe this Great Man impos'd upon, and to have have taken his *Long-tail'd Toads* upon Truſt; and we may ſuppoſe the Impoſer had never ſeen any *Tadpoles* before.

To this ſuſpicious Story of *Toads*, give me leave to add a true Story of *Locuſts* in the Time of *Plague*. The *Plague* happens frequently in the Country of the *Coſſacks*, or *Ukrani* (in the Southern Parts of the States of *Poland*) where, in dry Summers,

mers, they are infeſted with ſuch Swarms of *Locuſts*, driven thither by an *Eaſt* or *South-Eaſt* Wind, that they darken the Air in the faireſt Weather, and devour all the Corn of that Country, laying their Eggs in Autumn, and then dying: But the Eggs, of which every one lays two or three Hundred, hatching the next Spring, produce again ſuch a Number of *Locuſts*, that then they do more Miſchief than before, unleſs Rains fall, which kill both *Eggs* and *Inſects*, or unleſs a ſtrong *North* or *North-Weſt* Wind ariſe, which drives them into the *Euxine* Sea.

I ſhall only ſubjoin one Account more of an odd Sort of *Maggots* found in the Time of Plague, given by Dr. M. LISTER (*Phil. Tranſ.* N$_0$ 160. p. 595.) — In the Harveſt-time 1666. (ſays he) the Sickneſs then raging at *Cambridge*, at *Baſſenburn* in *Cambridgeſhire*, there were Millions of *Maggots* on the *Corn Lands*; and in their Barns too, the Floor wou'd be cover'd with them that fell from the Carts. The *Maggots* were about half an Inch long, no thicker than a *Pigeon's Feather*, of a White Colour, ſomewhat ſhaded with an

Iſabella

Iſabella or faint yellowiſh Stripes, the Length of the *Worm:* they had fourteen Feet, after the manner of many *Caterpillars*, and I was almoſt confident would have produc'd ſome ſort of *Moth.* I took up about a Score of them and put them into a Box; but they immediately offended me with an ungrateful and ſtrong Stink, which yet is not uſual to the Caterpillars-kind. After two Days I rid my ſelf of them, and only obſerv'd, that the *Excrements* which they voided, were little hard *Pellets*, of pure white Flour like that of Barley.

Some Years after this there was ſuch a Swarm of certain ſort of *Inſects* in *New-England*, that for the Space of 200 Miles they poiſon'd and deſtroy'd all the Trees of the Country, there being found innumerable little Holes in the Ground out of which thoſe *Inſects* broke forth in the Form of *Maggots*, which turn'd into Flies that had a kind of *Tail* or *Sting* which they ſtruck into the Tree, and thereby envenom'd and kill'd it.

Another Sign of the Peſtilential Infection of the Air, and conſequently of Sickly Seaſons,

Seaſons, is the *Roots* in the Earth, ſuch as *Carrots* and *Parſnips*, which have been obſerv'd to be more Sweet and Luſcious in Infectious Years than others.

Other Signs of *Peſtilential* Seaſons we have from *Great and Early Heats* in the Spring-time (particularly in *May*) without Winds.

A Dry *March* and a Dry *May*, portend a wholſome Summer, if there be a Showry *April* between; but otherwiſe it is a Sign of a *Peſtilential* Year. And generally Years with little Wind or Thunder portend the ſame.

Great *Droughts* in Summer, laſting till toward the End of *Auguſt*, and ſome gentle Showers upon them, and then ſome Dry Weather again, do portend a *Peſtilential* Summer the Year following: for about the End of *Auguſt* all the Sweetneſs of the Earth which goes into Plants and Trees is exhal'd (and much more if the *Auguſt* be Dry) ſo that nothing then can break forth of the Earth but a groſs Vapour, which is apt to corrupt the Air; and that Vapour by the firſt Showers, if they be gentle, is releas'd, and comes forth

abundantly. Therefore they that come abroad ſoon after thoſe Showers, are commonly taken with Sickneſs. And in *Africa* no body will ſtir out of Doors after the Firſt Showers. But if the Showers come vehemently, then they rather waſh and fill the Earth, than give it leave to break forth preſently. But if Dry Weather come again, then it fixes and continues the Corruption of the Air upon the Firſt Showers begun, and makes it of *ill Influence* even to the next Summer, except very Froſty Weather diſcharge it, which ſeldom ſucceeds ſuch *Droughts*.

The Leſſer Infections of the *Small-pox*, *Purple-Fevers* and *Agues* in the Summer precedent, and hovering all Winter, do portend a great *Peſtilence* in the Summer following: for Putrefaction does not ariſe to its Height at once.

My Lord BACON adviſes this Experiment, to lay a Piece of *Raw Fleſh* or *Fiſh* in the open Air for Trial, and if it Putrefy quickly, 'tis a Sign of a Diſpoſition in the Air to *Putrefaction*. And becauſe you cannot be inform'd, whether the *Putrefaction* be quick or late, except you compare

compare this Experiment with the like Experiment in another Year; it were not amiſs in the ſame Year, and at the ſame Time, to lay one Piece of Fleſh or Fiſh in the Open Air, and another of the ſame Kind and Bigneſs within Doors: For I judge (ſays he) that if a General Diſpoſition be in the Air to *Putrefy*, the Fleſh or Fiſh will ſooner Putrefy Abroad where the Air is ſtronger and has more Power, than in the Houſe where it is weaker and has leſs, being many ways Corrected. And this Experiment wou'd be beſt made about the End of *March*; for that Seaſon is the likelieſt to diſcover what the Winter has done, and what the Summer following will do upon the Air. And becauſe the Air no doubt receives great Tincture and Infuſion from the Earth, 'twere good to try that Experiment of *raw Fleſh* both upon a Stake of Wood and upon the Superficies of the Earth, ſays my Lord BACON.

But there is a more Modern Experiment than this, and that is by tying a Bit of Raw Fleſh to the Tail of a Paper Kite, and keeping it up a great Height in the Air for a conſiderable Time.

It has been noted by the Ancients, that *Southern-Winds* blowing much *without* Rain, do cauſe a *Feveriſh* Diſpoſition of the Air; but *with* Rain, not. The Cauſe is, for that *Southern-Winds* do of themſelves qualify the Air to be apt to cauſe *Fevers*; but when Showers are join'd, they do refrigerate in part, and check the Sultry Heat of the *Southern Wind*. Therefore this holds not in the Sea-Coaſts, becauſe the Vapours of the Sea without Showers, do refreſh.

The Cauſe aſſign'd to Malignant Epidemical Diſeaſes, particularly the *Plague*, by the Ingenious and Learned Dr. MEAD, is a Hot and Moiſt Temperament of the Air, which is obſerv'd by HIPPOCRATES, GALEN, and the General Hiſtories of Epidemical Diſeaſes, to attend thoſe Diſtempers. *Vid.* MEAD of *Poiſons*, Eſſay V. p. 161. But indeed (ſays the Reverend and Ingenious Mr. DERHAM, in his *Phyſico-Theol.*) whether the Cauſe be this, or Poiſonous, Malignant Exhalations (as others think) the Winds are however very ſalutiferous in ſuch Caſes, in Cooling the Air, and diſperſing and driving away the Moiſt

Moiſt or *Peſtiferous* Vapours. It is well obſerv'd (in my Lord HOWARD's Voyage to *Conſtantinople*) that at *Vienna* they have frequent *Winds*, which if they ceaſe long in Summer, the *Plague* often enſues: So that it is now grown into a Proverb, *That if Auſtria be not Windy, it is ſubject to Contagion.* BOHUN *of Wind*, p. 213.

From ſuch Commotions of the Air (ſays Mr. DERHAM) I imagine it is, that at *Grand-Cairo* the *Plague* immediately ceaſes as ſoon as the *Nile* begins to overflow; altho' Mr. BOYLE attributes it to Nitrous Corpuſcles. *Determ. Nat. Effluv.* ch. 4.

Nulla enim propemodum Regio eſt, quæ non habeat aliquem *Flatum* ex ſe naſcentem, & circa ſe cadentem.

COMETS likewiſe are reckon'd amongſt the Signs of *Peſtilential Seaſons*. For *Comets* conſiſting of a vaſt Quantity of Hot and Fiery Exhalations, upon their Expiration corrupt the Air with Poiſonous Infection, which infects the Bodies of Men and Beaſts with Mortal Diſtempers; and is not without Reaſon accounted the Natural Cauſe of Wars and Commotions in the World; theſe Hot Exhalations being too

apt to heat and blow up the Choleric Tempers of Men to Anger and Contention. Thus VIRGIL Lib. x.

Non Secùs ac liquidâ ſi quando nocte COMETÆ
Sanguinei lugubre rubent, aut SIRIUS Ardor:
Ille *Sitim Morboſque* ferens mortalibus ægris
Naſcitur, & lævo contriſtat lumine Cœlum.

i. e.

Thus blazing COMETS *in the Night appear*
In Sanguine Fires, and thus the threatning STAR
Of SIRIUS *fills the Air with diſmal Lights,*
And anxious Men with Plagues *and Famines frights.*

MILTON continues,

—— *A* COMET *that from his horrid Hair*
Shakes Peſtilence *and War.*

EARTH-QUAKES likewiſe are ſometimes Forerunners of *Peſtilential* Seaſons; by ſending out great Quantities of Noxious Exhalations. Dr. WINCLER gives an Account of a *Murrain* in *Switzerland,* that he thinks was occaſion'd by three diſtinct *Earthquakes* that happen'd in the Space of one Year. On the Borders of *Italy* (ſays he) a *Murrain* infeſted the Cattle; which ſpread farther into *Switzerland,* the Territories of *Wirtemberg,* and over other *Provinces,* and made great Deſtruction among them. The *Contagion* ſeem'd to propagate it ſelf in the Form of a *Blue Miſt,*

Miſt, that fell upon thoſe Paſtures where the Cattle graz'd, inſomuch that Herds return'd home Sick, and moſt of them died away in 24 Hours.

To conclude this Chapter: The Signs and Forerunners of the *Plague*, according to LUDOVICUS GARDINIUS, and EBERHARDUS GOCKELIUS, are as follow:

1. If *Spring* and *Summer* have been too *Moiſt*; if Winter and Autumn too Wet, and not Cold enough.

2. If the *South-Winds* have blown without Tempeſts or Hurricanes.

3. If the *Air*, for ſome Time together, *changes often in a Day*, and is ſometimes Hot, and then Cold, now Cloudy and then Clear; yet the Clouds hang low, the Air is Sultry, and the Heavens threaten Rain without any falling.

4. If there be an extravagant Quantity of *Stinking Atoms*, *Inſects*, or *Animals*, as of Flies, Frogs, Snakes, Locuſts, *&c.* Or if Birds retreat to ſolitary Places and forſake their Neſts.

5. If *Famine* happen, or there be too great Plenty of corrupted Meats: Or if a Na-

a Nation be afflicted with Troubles and Poverty, that may throw them into a Conſternation : Or if Wars have been among them, and their Dead lie unburied.

6. If unuſual Fires or *Comets* have appear'd in the Sky, or ſtrange Meteors ſeen in the Air, making great Alterations in Natural Bodies.

7. If *Small-pox*, *Putrid Fevers*, and ſuch-like Contagious Diſeaſes reign, whereby the Air is often Corrupted.

8. If the *Plague* rages in a neighbouring Country, we are to be fearful of its ſpreading Influence, ſince 'tis eaſy to be communicated either by Air, infected Goods, or Perſons.

For Contagion is produc'd by an Efficient Cauſe ; which Efficient Cauſe is either a Venomous Putrefaction or Peſtilential Infection of the Air, which acts Internally and Externally upon a Human Body, either by entring the Pores, or paſſing the Contagious Particles into the Lungs, and ſo communicating its deadly Ferment to the Blood and Humours.

Signs of Scarcity and Dearth.

AT the Riſe of the River *Kennet* in *Wilts*, which is between *Weſt-Kennet* and *Overton*, there are Stones like Rocks (from whence there is a Village call'd *Rock-ley*) between which there ſometimes breaks out Water on a ſudden in the manner of a Land-Flood, which the Common People call *Hunger-bourn* (i. e. a Rivulet of Hunger) becauſe it is commonly the Prognoſtic of Great *Scarcity*, ſays CAMDEN. That the ſudden Eruption of Springs in Places where they uſe not always to run, ſhou'd be a Sign of DEARTH, is no Wonder, ſays Dr. CHILDREY. For theſe unuſual Eruptions (which in *Kent* they call *Nail-bourns*) are caus'd by extreme Gluts of *Rain*, or laſting Wet Weather, and never happen but in Wet Years (witneſs the Year 1648, when there were many of them); in which Years Wheat and moſt other Grain thrive not well (for a certain Reaſon) and therefore a DEARTH ſucceeded the Year following. The Country Proverb in *Kent* is, *That* Drought *never makes a* DEARTH;

DEARTH; which was sufficiently verify'd in the Years 1654 and 1655 when (after that lasting *Drought* that began in 1651, and continu'd till 1655) the Price of Wheat fell to 1 *s.* 6 *d.* a Bushel, and other Grain proportionably. And to our Purpose, very remarkable it was in the Year 1654, that several Springs and Rivulets, were quite dry'd up by reason of the precedent *Drought*, which rag'd most in 1651-52-53. As the Head of the *Stour* that rises near *Eltham* in *Kent*, and runs thro' *Canterbury*, was Dry for the Space of some Miles; and the like happen'd in the Stream that crosses the Road-way between *Sitting-bourn* and *Canterbury* at *Ospring* near *Feversham*, which at other Times ran with a plentiful Current, but then wholly fail'd, like the Brooks in *Israel* in *Ahab*'s Time.

There is likewise near *St. Alban's* in *Hertfordshire* a Brook call'd *Wenmere* or *Womere*, which never breaks out but it foreruns DEARTH and Scarcity of Corn.

The Rising of a *Bourn* or Stream near *Croyden* in *Surrey* presages DEARTH or the *Plague*; and it has been observ'd to fall out so. The Rising of *Bourns* in Places

Places where they run not always, is caus'd by great *Wet* Years, which (according to HIPPOCRATES) are generally the moſt Sickly; and if they prove Hot as well as Wet (becauſe Heat and Moiſture are the great Diſpoſers to Putrifaction) they prove alſo Malignant, and for the moſt part Peſtilential. And the Reaſon why the Riſing of this *Bourn* does not always preſage the Plague, is becauſe all Wet Years do not prove Hot.

The Reverend and Ingenious Mr. MORTON (in his *Nat. Hiſt. of Northamptonſh.* p. 320.) mentions a ſmall Spring of the Temporary Kind, that preſages *Dearth*. It is of great Note with the Vulgar, and is call'd *Marvel-ſike Spring* in *Boughton* Field, about two Bows-ſhoot from *Brampton*-Bridge nigh *Kingſthorp* Road. It never runs but in mighty Gluts of Wet: and whenever it does, is thought Ominous by the Country People, who from the Breaking-out of that Spring, are wont to prognoſticate *Dearth* or the Death of ſome Great Perſon, or very Troubleſome Times. It did not run when I was there, on *October* 22. 1703. but the foregoing

Winter it did, and had not run before of two Years. That Winter was a very wet one, and obſervable for the Breaking-out of ſuch Springs as theſe.

There are likewiſe ſeveral *Pools* in *Staffordſhire* that preſage a DEARTH, either by Riſing or Overflowing: Such is *Moſs-Pool* near *Moreton* in the Pariſh of *Aldridge*; the Riſing of the former, and the Exundation of the latter (which generally at other Times is almoſt Dry) being taken for certain Signs of a DEARTH of Corn. But the moſt famous is *Hungry*-Pit, not far from *Billington*, which predicts SCARCITY by its Riſe upon Sticks ſet upright in the Mud, which the People place there every one for their own particular Obſervations; fore-judging the Riſe or Fall of Corn in Markets by the Riſe or Fall of the Water on theſe Sticks, and ſo either Keeping or Vending it accordingly: wherein it ſo little regards the Quality of the Weather, that it overflows ſometimes in the greateſt DROUGHTS. By which Remarks ſome have advanc'd their Fortunes conſiderably. The Reaſon of this Dr. PLOT reſolves into the Mediation of Springs.

But

But of all the Signs of SCARCITY and DEARTH, your violent *Earthquakes* are the ſureſt. For the Earth having emitted ſo much of its fertile Qualities in ſuch violent Evaporations, a SCARCITY muſt enſue not only for the Preſent, but for ſome Years After.

Signs of Continuance of Weather.

SOME that have been very Curious Obſervers of the Weather, have laid down this as a pretty good Rule to be enſur'd of the Weather for four or five Days together (if a Man was to go a Journey or ſo) and not fail one time in ten; which is this, When the *Wind* has been in the *North*, or *North-Eaſt*, two Days without Rain, and continues in the ſame Point the third Day, then one may venture to go a Journey, if the Air be clear: Becauſe one may wait a Month or two for a Week of Fair Weather together, and not have it. Therefore this Rule is of Uſe every Week for a ſingle Day or two.

Signs of the Weather from the Weather-glaſſes.

THE principal Obſervations made upon the *Barometer* by the Learned Dr. HALLEY (*Philoſ. Tranſ.* N° 181.) from the different Heights of *Mercury* at ſeveral times, are theſe;

The Firſt is, That in Calm Weather, when the Air is inclin'd to Rain, the *Mercury* is commonly Low.

2. That in Serene good Settled Weather, the *Mercury* is generally High.

3. That upon very great Winds, tho' they be not accompanied with *Rain*, the *Mercury* ſinks loweſt of all, with relation to the Point of the Compaſs the Wind blows upon.

4. That, *cæteris paribus*, the greateſt Heights of the *Mercury* are found upon *Eaſterly*, and *North-Eaſterly* Winds.

5. That in Calm Froſty Weather the *Mercury* generally ſtands High.

6. That after very great Storms of Wind, when the *Quick-ſilver* has been Low, it generally riſes again very faſt.

7. That

7. That the more Northerly Places have greater Alterations of the *Baroſcope* than the more Southerly.

8. That within the *Tropicks* and near them, thoſe Accounts we have had from Others, and my Own Obſervations at *St. Helena*, make very little or no Variation of the Height of the *Mercury* at all Weathers.

Hence I conceive that the Principal Cauſe of the Riſe and Fall of the *Mercury*, is from the variable Winds which are found in the *Temperate Zones*, and whoſe great Inconſtancy here in *England* is moſt notorious.

A ſecond Cauſe is the uncertain Exhalation and Recipitation of the Vapours lodging in the Air, whereby it comes to be at one time more crowded than at another, and conſequently Heavier; but this latter in a great meaſure depends upon the former. Now from theſe Principles I ſhall endeavour to explicate the ſeveral Phænomena of the *Barometer*, taking them in the ſame Order I laid them down: Thus,

1. The *Mercury*'s being Low inclines it to Rain, becauſe the Air being light, the

the Vapours are no longer ſupported thereby, being become ſpecifically Heavier than the *Medium* wherein they floated; ſo that they deſcend towards the Earth, and in their Fall, meeting with other Aqueous Particles, they incorporate together, and form little Drops of Rain: But the *Mercury*'s being at one time Lower than at another, is the Effect of two contrary Winds blowing from the place where the *Barometer* ſtands; whereby the Air of that Place is carried both Ways from it, and conſequently the incumbent Cylinder of Air diminiſh'd, and accordingly the *Mercury* ſinks; as for inſtance, If in the *German* Ocean it ſhou'd blow a Gale of *Weſterly* Wind, and at the ſame time an *Eaſterly* Wind in the *Iriſh* Sea: Or if in *France* it ſhou'd blow a *Northerly* Wind, and in *Scotland* a *Southerly*; it muſt be granted me that that Part of the Atmoſphere impendent over *England*, wou'd thereby be exhauſted and attenuated, and the *Mercury* wou'd ſubſide, and the Vapours which before floated in thoſe Parts of the Air of equal Gravity with themſelves, wou'd ſink to the Earth.

2. The

2. The greater Height of the *Barometer* is occaſion'd by two contrary Winds blowing towards the Place of Obſervation, whereby the Air of other Places is brought thither and accumulated; ſo that the incumbent Cylinder of Air being increas'd both in Height and Weight, the *Mercury* preſs'd thereby muſt needs riſe and ſtand High, as long as the Winds continue ſo to blow, and then the Air being ſpecifically Heavier, the Vapours are better kept ſuſpended, ſo that they have no Inclination to precipitate and fall down in Drops, which is the Reaſon of the Serene Good Weather which attends the greater Heights of the *Mercury*.

3. The *Mercury* ſinks the Loweſt of all by the very rapid Motion of the Air in Storms of Winds. For the Tract or Region of the Earth's Surface, wherein theſe Winds rage, not extending all round the Globe, that ſtagnant Air which is left behind, as likewiſe that on the Sides, cannot come in ſo faſt as to ſupply the Evacuation made by ſo ſwift a Current; ſo that the Air muſt neceſſarily be attenuated, when and where the ſaid Winds continue

to

to blow, and that more or leſs according to their Violence : add to which, that the Horizontal Motion of the Air, being ſo quick as it is, may, in all probability, take off ſome part of the perpendicular Preſſure thereof : And the great Agitation of its Particles, is the Reaſon why the Vapours are diſſipated, and do not condenſe into Drops ſo as to form Rain, otherwiſe the natural Conſequence of the Air's Rarefaction.

5. The *Mercury* ſtands the Higheſt upon an *Eaſterly* or *North-Eaſterly* Wind, becauſe in the Great *Atlantic* Ocean, on this ſide the 35th Deg. of *North* Latitude, the *Weſterly* and *South-Weſterly* Winds blow almoſt always Trade ; ſo that whenever Here the Wind comes up at *Eaſt* and *North-Eaſt*, 'tis ſure to be check'd by a contrary Gale, as ſoon as it reaches the *Ocean* ; wherefore, according to what is made out in our Second Remark, the Air muſt needs be heap'd over this *Iſland*, and conſequently the *Mercury* muſt ſtand High, as often as theſe Winds blow. This holds true in *This Country*, but is not a general Rule for others, where the Winds are under

der different Circumstances: And I have sometimes seen the *Mercury Here* as Low as 29 Inches upon an *Easterly* Wind, but then it blew exceeding hard, and so comes to be accounted for, by what was observ'd upon the Third Remark.

5. In Calm Frosty Weather the *Mercury* generally stands High, because (as I conceive) it seldom freezes but when the Winds come out of the *Northern* and *North-Eastern* Quarters, or at least unless those Winds blow at no great distance off: For the *Northern* Parts of *Germany*, *Denmark*, *Sweden*, *Norway*, and all that Tract from whence *North-Eastern* Winds come, are subject to almost continual Frost all the Winter; and thereby the Lower Air is very much Condens'd, and in that State is brought *Hitherwards* by those Winds, and being accumulated by the Opposition of the *Westerly* Wind blowing in the *Ocean*, the *Mercury* must needs be press'd to a more than ordinary Height; and as a concurring Cause, the shrinking of the Lower Parts of the Air into lesser room by Cold, must needs cause a Descent of the Upper Parts of the Atmosphere to re-

duce the Cavity made by this Contraction to an *Æquilibrium*.

6. After great Storms of Wind, when the *Mercury* has been very Low, it generally Riſes again very faſt: I once obſerv'd it to Riſe an Inch and half in leſs than ſix Hours after a long continu'd Storm of *South-Weſt* Wind. The Reaſon is, becauſe the Air being very much rarify'd by the great Evacuations which ſuch continu'd Storms made thereof, the neighbouring Air runs in the more ſwiftly to bring it to an *Æquilibrium*, as we ſee Water runs the faſter for having a great Declivity.

7. The Variations are greater in the more *Northerly* Places, as at *Stockholm* greater than at *Paris* (compar'd by M. PASCALL), becauſe the more *Northerly* Parts have uſually greater Storms of Wind than the more *Southerly*, whereby the *Mercury* ſhou'd ſink Lower in that Extreme; and then the *Northerly* Winds bringing the condens'd and ponderous Air from the Neighbourhood of the *Pole*, and that again being check'd by a *Southerly* Wind, at no great diſtance, and ſo heap'd, muſt of Neceſſity make the *Mercury*, in ſuch Caſe, ſtand Higher in the other Extreme.

8. And

8. And laſtly, this Remark, That there is little or no Variation near the *Æquinoctial*, does above all others, confirm the Hypotheſis of the Variable Winds being the Cauſe of theſe Variations of the Height of the *Mercury*; for in the Places above-mention'd, there is always an eaſy Gale of Wind blowing nearly from the ſame Point, *viz.* E. N. E. at *Barbadoes*, and E. S. E. at *St. Helena*; ſo that there being no contrary Currents of the Air to exhauſt or accumulate it, the Atmoſphere continues much in the ſame State: However upon Hurricanes (the moſt violent of Storms) the *Mercury* has been obſerv'd very Low, but this but Once in two or three Years, and it ſoon recovers its ſettled State of about 29 Inches and a Half.

Dr. WALLIS's Obſervations on the *Barometer* are theſe:

In thick foggy Weather I find my *Quick-ſilver* to Riſe; which I aſcribe to the Heavineſs of the Vapours in the Air.

In Sun-ſhiny Weather it Riſes alſo (and commonly the Clearer, the more) which I think may be imputed partly to the Vapours rais'd by the SUN, and making the

Air heavier; and partly to the Heat, increasing the Elastic or Springy Power of the Air: which latter I rather add, because I have sometimes observ'd in Sun-shiny Weather, when there have come Clouds for some considerable Time (suppose an Hour or two) the *Quick-silver* has fallen; and then the Sun's breaking out again, it has Risen as before.

In Rainy Weather it uses to fall (of which the Reason is obvious, because the Air is lighten'd by so much as falls): In Snowy Weather likewise, but not so much as in Rain. And sometimes I have observ'd it upon a Hoary Frost falling in the Night.

In Windy Weather I find it generally to Fall; and that more universally, and more discernably, than upon Rain (which I attribute to the Wind's moving the Air Collaterally, and thereby not suffering it to press so much directly downwards; the like of which we see in Swimming, *&c.*) and I have never found it Lower than in High Winds.

I have divers times, upon discerning my *Quick-silver* to Fall without any visible Cause at Home, look'd Abroad, and found (by

(by the Appearance of broken Clouds, or otherwiſe) that it had rain'd not far off, tho' not with Us: whereupon the Air being then Light'ned, our Heavier Air (where it rain'd not) may have in part diſcharg'd it ſelf on that Lighter.

Dr. LISTER's Obſervations on the *Barometer* are theſe:

In *England*, in a violent Storm, or when the *Quick-ſilver* is at the very Loweſt, it then viſibly breaks and emits ſmall Particles (as I have more than once obſerv'd) which Diſorder I look upon as a kind of Fretting; and conſequently at all times of its Deſcent, it is more or leſs upon the Fret. In this Diſorder of the *Quick-ſilver*, I imagine it has its Parts contracted; becauſe then the *Quick-ſilver* emits freſh Particles of Air into the Tube, which increaſing the Bulk of the Air, and conſequently its Elaſticity, the *Quick-ſilver* is neceſſarily depreſs'd thereby. And that much Air is mix'd with it, appears from the Application of a heated Iron to the Tube, as is practis'd in the Purging of it that Way.

Now when the *Quick-ſilver* Riſes in the Tube (which it certainly does both in

Hot

Hot and Frosty Weather) it may then be in a Natural State, free, open, and expanded like it self, which it seems it ever is within the *Tropicks*, and with Us only in very Hot and very Frosty Weather. But when it descends, it is then contracted, and as it were convuls'd and drawn together, as it mostly is in our *Climate* of *England*, and more or less (as we guess) in all Places on this Side the *Tropicks*. Which Contraction plainly appears from the Concave Figure of both Superficies, not only in that of the *Quick-silver* in the Tube, but also (if well observ'd) in that which stagnates in the Pot or Dish it self.

The Difficulty seems to lie in the Reconciling the same Effect of the *Quick-silver*'s Rising in the Tube, from such seemingly-different Causes, as great Heat and intense Frost: And those who shall willingly assent to us in one Particular, and grant us Warmth as a probable Cause of its Restitution to its Nature, will yet be at a stand how to imagine, that Great Frost likewise shou'd bring the *Quick-silver* nearer to its own Nature too. I answer, That *Salts* liquify'd will coagulate or crystalize,

ſtalize, *i. e.* will return to their own proper Natures, both in Cold and in Heat: And therefore tho' moſt Men practiſe the Setting them in a Cool Cellar for that Purpoſe, yet ſome (as ZWELFER) adviſe, as the beſt means to have them ſpeedily and fairly Cryſtaliz'd, to keep them conſtantly in *Balneo*. Thus alſo the *Lympha* of the *Blood* does become a Jelly if you ſet it in a Cool Place, and the ſame is by Warmth in like manner inſpiſſated.

It will not be amiſs to add by way of Corollary a Note concerning Healthful and Sickly Seaſons, more particularly as may refer to this *Phænomenon* of Great Cold and Froſt. If therefore *Quick-ſilver* and *Liquids* are neareſt their own Natures, and have leſs Violence done to them, in very Cold and very Hot Seaſons; the Humours of our Bodies, as *Liquids*, in all Probability muſt be in ſome meaſure accordingly affected. And that therefore Cold is Healthful, I argue from the vaſt Number of Old Men and Women to be found upon the Mountains of *England*, comparatively to what are found elſewhere.

Again,

Again, the *Blood* itſelf (or the vital *Liquor* of Animals equivalent to it) is in moſt kinds of Animals in Nature, or its Natural State, ſenſibly Cold; for that the Species of Quadrupeds and Fowls are not to be compar'd, for Number, to Fiſhes and Inſects; there being in all Probability (by what I have obſerv'd) above a hundred Species of theſe latter Creatures, whoſe Vital Juice is Cold, to one of the former: But becauſe we moſt converſe with thoſe whoſe Vital Juice is Hot, we are apt to think the ſame of all.

Mr. BOYLE has left us theſe general Obſervations and Directions concerning the *Barometer*:

1. It will be requiſite to note the Day and Hour in which Obſervations are made.

2. The Situation of the Place where the *Barometer* ſtands as to Height, ſince by the Length of the Atmoſpherical Pillar of Air, that preſſes upon it, the Height of the *Mercury* may vary, tho' not always exactly; for ſometimes upon Changes in the Air not otherwiſe obſervable, the *Mercury* will ſubſide more than uſually in that which ſtands fartheſt from the Centre of

of the Earth, when at the ſame time it does not proportionably ſubſide in that which is plac'd in a Lower Station. And

It perhaps may be worth noting, whether upon exceſſive Droughts, when the Ground is parch'd and crack'd, ſome Subterraneal Effluvia may not riſe, which may add a Specific Gravity to the Air.

Nor will it be needleſs, when other Obſervations are making, at the ſame time to obſerve the Weather; as alſo what Winds blow, and whether Violent or more Remiſs. For ſometimes it is obſerv'd, that when High Winds blow, the *Mercury* is the Lower, tho' not always.

But to favour what has been intimated, *viz.* That the Alterations in the Weight of the Air depend on Subterraneal Steams mix'd with it; it has been obſerv'd that after long Droughts, upon a Shower of Rain, ſo many Steams have been either prevented from Riſing, or depreſs'd and precipitated, that the *Mercury* has ſubſided within Two ſixteen Parts of an Inch.

The Reverend and Ingenious Dr. DESAGULIERS's Account of *Barometers* is this;

'Tis evident that the *Mercury* within the Tube gravitates as much on the Surface

of the ſtagnant Mercury, as the Air does on the reſt of its Surface; and that a Column of Air reaching to the Top of the Atmoſphere, is of the ſame Weight with a Column of *Mercury* of the ſame Baſis, and of an Height equal to the *Mercury* in the Tube. Now if the Air ſhou'd grow Heavier, and preſs more on the Surface of the ſtagnant Mercury, then the *Mercury* in the Tube might riſe Higher, that it may be equal in Weight to a Column of Air of the ſame Baſis, reaching to the Top of the Atmoſphere.

Hence it follows, that the Height of the *Mercury* in the Tube may be fitly apply'd to meaſure the Gravity of the Air, and on that account an Inſtrument fitted to that purpoſe is call'd *A Barometer*.

Sometimes the *Mercury* Riſes 31 Inches, ſometimes it ſtands at 29, but ſeldom under, and of Conſequence the Gravity of the Air muſt alter proportionably.

Since Gravity is always proportionable to the Quantity of Matter, it is impoſſible that the Air ſhou'd change its Gravity, without changing its Quantity of Matter; and therefore ſome have thought this Difference

ference of the Air's Gravity to proceed from its being more or leſs overcharg'd with Vapours: If this were the Caſe, there muſt be as many Vapours in the Air at a time, as are equal to three Inches of *Mercury*, for ſo much we find the *Mercury* riſes or falls.

Now *Mercury* is about fourteen times Heavier than Water, and conſeqnently there muſt be in the Air at once as many Vapours as will equal in Length a Column of Water of forty-two Inches High, and whoſe Baſis is equal to the Surface of the Earth; which is more than falls down in Rain during a whole Year; for a whole Year's Rain does not fill a Veſſel above fourteen or fifteen Inches High, as is obſerv'd in the Hiſtory of the Royal Academy at *Paris*.

The Reaſon then why the Air is Heavier at one time than another, ariſes from there being more Air on that Part of the Earth's Surface where the Air grows Heavier, and this proceeds from Winds; *e. gr.* If the Wind (which is nothing but a Stream of Air) ſhou'd blow over any Place, and the Air thus mov'd ſhou'd be kept in that

Place by Mountains or Hills; or if two Contrary Winds ſhou'd blow on the ſame Place, the Air wou'd be heap'd up in the Middle, and conſequently there being more Air, its Gravity will be encreas'd: But if a Wind ſhou'd blow over a Country, the Air which is over that Place will be leſs in Quantity, and conſequently Lighter. Hence it is plain, that Winds are the only Cauſe of the Air's Gravity.

When the Air is Heavy, the Sun acting on the Surface of the Water raiſes the Vapours from it; theſe being rais'd are ſpecifically Lighter than Air, and conſequently they muſt riſe Higher, till they come to an Air of the ſame ſpecifick Gravity with themſelves, where they will reſt; and a vaſt Collection of theſe Vapours from Clouds, ſo long as the Air continues Heavy, the Vapours will be ſuſtain'd, and the *Weather* will be Fair. But if the Air turns Lighter, the Vapours which were in *Æquilibrio* with it before, will now preponderate, and conſequently deſcend: In their Deſcent being continually check'd by the greater Reſiſtance of Air with which they meet, they will be Condens'd; this Con-

denſation

denſation will ſtill grow more and more, till at laſt they are form'd into Drops of *Rain.*

Hence it follows, That when the *Mercury* is High, then the *Weather* will be Fair; and when it Falls Low, the Vapours then not being ſufficiently ſuſtain'd by the Air, muſt alſo Fall, and the *Weather* will be Rainy, and the Rain more or leſs according as the *Mercury* Riſes or Falls in the Tube. Upon this Principle common Weather-Glaſſes are made.

I ſhall conclude this Chapter with a Word or two about *Hygrometers.* As the *Thermometer* meaſures the Degrees of Cold and Heat, and the *Barometer* thoſe of the Weight of the Air, ſo we may make uſe of a Machine call'd *Hygrometer* or *Hygroſcope* to meaſure the Dryneſs or Humidity of the Air; for certain it is, that the Air is more or leſs Moiſt, as it is more or leſs ſtock'd with Vapours.

One ſort of *Hygrometer* may be made of a String of Cat-gut, five Foot long, made faſt at its two Extremities, againſt any Wall or Wainſcot, loaded in the middle with a Lead-Weight of nine Ounces

and

and three Quarters, tied to the String, which will lower it more or leſs according to the Degrees of the Dryneſs or Moiſture of the Air mark'd upon a perpendicular Plain divided into equal Parts, like the Table belonging to a *Barometer* : for when the String has been ſteep'd in Brine, the Moiſtneſs of the Air will contract it, and ſo raiſe the Weight ; and on the contrary, the Dryneſs of the Air will extend it, and conſequently the Weight will ſink. You may alſo contrive an Index to be plac'd againſt the Degrees of Variation, to ſlide Higher or Lower, and by it diſcover how much the *Weather* varies every Day, or is at a Stand. Inſtead of Cat-ſtring you may have a Piece of Packthread or Whip-cord five Foot long, which indeed ſeems to be more ſuſceptible of Moiſture ; for Moiſture eaſily inſinuates into all Porous Bodies, and above all, into Strings which ſhorten ſenſibly upon the acceſſion of the leaſt Moiſture. Thus when SIXTUS V. ſet up the Obelisk of the *Vatican* in *Rome*, the Cables being made longer by that huge Weight, which (M. OZANAM tells us) weigh'd one Million, ſix Thouſand, forty-

eight

eight Pounds, he order'd the Cables to be ſoak'd in Water, upon which they ſhrunk ſo that they ſet that huge Maſs upon its Baſis, as it now ſtands. Thus M. OZANAM tell us in a few Words; but the true Story is this, and worthy of a Digreſſion. The aforemention'd *Obelisk* is ſtill ſtanding in *Rome*, and conſiſts of one ſolid Stone, a kind of Ophite or ſpotted Marble, anciently conſecrated to the Honour of the the Emperor JULIUS CÆSAR, and erected in the Cirque of NERO; but in the Year 1586, remov'd into a more eminent Place, at the vaſt Charge of Pope SIXTUS QUINTUS, and by the admirable Skill of DOMINICUS FONTANUS, an excellent Architect and Engineer. This Stone is in Height 170 Foot above the Baſe, in Breadth at the Bottom 12 Foot, at the Top 8 Foot. It weigh'd 9,586,148 *lb.* And the Weight of the Cables, Cords, and Pullies, and other moveable Inſtruments uſed in raiſing it, amounted to 1,42,824 *lb.* according to the Computation of GEORGIUS DRANDIUS. The Removing and Erection of this *Obelisk*, was thought to be ſuch a rare Work of Art,

Art, that the Engineer, beſides the great Maſs of Treaſure he receiv'd for a Reward from his *Holineſs*, thereby acquir'd to himſelf immortal Renown; for no leſs than 56 Learned Men have ſince profeſſedly written, to deſcribe his Machines then uſed, and to celebrate his Praiſes, as MONANTHOLIUS tells us. But notwithſtanding all their Praiſes, he ow'd no ſmall Part of his Honour to Fortune, or rather to the Direction of a Carter, who ſtood by as an idle Spectator: For the Engineer a little miſtaken in his Forecaſt of the Stretching of the Cables and Ropes, found when he came to ſet the erected *Obelisk* upon the Pedeſtal, that he had not rais'd it high enough by two or three Inches, and to raiſe it Higher with thoſe Machines to ſtretch, it was impoſſible. Confounded with Shame and Deſpair by this unforeſeen Failure, he began to think of flying to ſave his Life, which he had pawn'd to the *Pope* to be forfeited if he did not accompliſh this difficult Work he had undertaken: When as Good Luck wou'd have it, out of the Crowd of vulgar Gazers, comes a poor Carter and adviſes him to

ſoak

ſoak all his Cables and Ropes in Water; which being done, the Ropes quickly ſwell'd and ſhortned themſelves; ſo that they lifted up the *Column* to a due Height, and then the over-joy'd *Engineer* with eaſe plac'd it upon the Pedeſtal.

The ſame is an Obſervation likewiſe amongſt *Mariners*, that new Cable being ſoak'd in Water, will ſhrink ſo that a large Ship, with the Current of the Sea and Violence of Tempeſts, is not able to ſtretch it out again.

'Tis alſo an Obſervation amongſt *Ringers*, that only the Humidity of the Air in foggy *Weather*, will ſo contract the *Bell-ropes*, that they will be too ſhort for them, ſo that they are often forc'd to let them out; for it is obſerv'd, that when two or three Men have us'd their whole Strength for ſome conſiderable time in raiſing a *Bell* of 20 or 30,00 *lb.* that the *Rope* will be ſtretch'd out but very little, till the Moiſture is again exhal'd out of it.

But to proceed —

Another Way of making a good *Hygroſcope* is, by putting a certain Quantity of *Salt-petre* well calcin'd, into one Scale of a juſt Balance, and an equal Weight of

Lead-Drops into the other, ſo as to make the Scales hang exactly in Æquilibrio; then add to the Centre of the Motion of the Balance, a ſmall Circle divided into equal Parts, repreſenting the Degrees of the Dryneſs or Moiſture of the Air, which the Tongue of the Balance will point to, as the Air grows Moiſter or Drier, for the Moiſter the Air grows, the more will the Lead riſe. Let the *Hygrometer* be fixt up in a Room where no Fire is wont to be made.

But the Invention of *Hygroſcopes* is endleſs: I ſhall therefore only add this Obſervation: Mr. FOUCHER, an ingenious *Frenchman* ſays, he has experienc'd, by means of an *Hygrometer*, that in Summer the *Weather* is Moiſter between Three and Nine in the Morning: and that the Air is Moiſter (or fuller of Vapours) at Full Moon, than when the Moon is near the Change.

An Eſſay towards accounting for a continued Courſe of Wet Years.

EVERY one knows, that (generally ſpeaking) *Great Rains* are ſucceeded by Great Droughts, and Great Droughts by

by Great Rains: But a continu'd Courſe of Wet Years is not ſo eaſily accounted for. PLUTARCH in his *Life of* MARIUS, makes this Obſervation, That Great Battles, generally ſpeaking, are attended with Great Rains. And in this I agree with him: But I do not like the Reaſon he gives for his Opinion. He makes the Great Effuſion of *Blood* in Time of War to be the Cauſe of theſe *Great Rains*, by reaſon of the thick Vapours that they produce. 'Tis enough to make any one's Blood riſe, to find that any Man in cool *Blood*, ſhou'd be ſo *bloodily* miſtaken, as to imagine that *Blood* ſhou'd be the Cauſe of *Rain*. For how is it poſſible there ſhou'd be ſufficient Quantities of *Blood* to create ſuch vaſt Bodies as Clouds? When once the greateſt Part of the Blood is reſolv'd into its firſt Principles, the Alcalious, Phlegmatic, and Terrene Parts ſubſiding (which are three Parts in five) there will remain no ſuch Quantities of the Volatile Alcalious, and Sulphureous Parts to be exhal'd ſo as to form any great matter of *Clouds* for ſuch great Rains. Beſides, the whole Maſs of *Blood* in a Human Body is reckon'd

at moſt to be but 24 Pound Weight and perhaps when a Man comes to be kill'd in Battle, either by a Cannon-bullet or Small-ſhot, his Body does not Bleed out above the odd four Pound Weight. Therefore I can ſcarce think it poſſible that the *Blood* of a Million of Men ſhed in ſeveral Battles ſhou'd be ſufficient to furniſh out, in Vapours and Exhalations, only one ſingle Cloud of Rain of ſeveral Miles Circumference, much leſs many Clouds, ſo as to make Long and Continu'd Rains.

Whatever might be the Cauſe of *Great Rains* in former Ages I ſhall not pretend to determine, but ſince the Invention and Firing of ſo much Gun-powder, in Times of War, (of which we have had the Experience in this laſt Age more than ever) I cannot but think that the Elements are much alter'd, and that we have had Greater Rains of late Years than ever were known in former Ages; and therefore I cannot but attribute theſe *Great Rains* to the vaſt Quantities of Sulphur and Nitre occaſion'd by the continual Exploſions of ſuch prodigious Quantities of Gun-powder in Time of War. For theſe great Quantities of

Sulphur

Sulphur and Nitre ariſing from the Exploſion of Gun-powder (beſides the ordinary Quantities of Sulphur and Nitre ariſing from the Exhalations out of the Pores of the Earth, together with the conſtant Vapours ariſing from the Seas and Rivers) do naturally produce Great Rains of themſelves, or elſe Thunder and Lightning continually attended with great Rains, and that not only immediately but for ſeveral Days and Weeks after. Which plainly ſhews that there is a natural Diſpoſition in Sulphur and Nitre to produce Rain, and any one knows that Sulphur and Nitre are diſſoluble in Water, and when they are embodied in a Watry Cloud; or however, it is Matter of Fact that Rain is the conſtant Concomitant of Thunder and Lightning which are caus'd by Sulphur and Nitre. We may call to mind (ſome of us) the Great Rains that were in the Time of the late *Civil Wars*. We may eaſily remember the continual Wet Years we had during the late twelve Years Campaign in *Flanders*, beſides thoſe occaſion'd by Wars likewiſe in ſeveral other Parts of the World at the ſame time. We may ſtill

more

more eaſily remember the Wet Summers during the late Wars in *Poland* and *Italy*, *&c.* when at one ſingle Siege there were at leaſt 5000 Bombs fir'd off, many of them 500 *lb.* Weight, and 10 *lb.* of Powder generally uſed in firing off each ſingle Bomb. The great Quantities of Powder exploded in the aforeſaid Wars muſt needs ſurely alter the Elements and be the Occaſion of more than Ordinary Rains. For nothing can be the Material Cauſe of Rain but Sulphur and Nitre, and the more the Clouds are ſupply'd with this Matter, the more the Earth will be ſupply'd with it, and conſequently by a reciprocal Motion of Aſcenſion and Deſcenſion we may (I think) reaſonably account for the unuſual Temperature of the Air, and the Unſeaſonableneſs of the Weather.

We may make the ſame Obſervations from the Eruptions of *Volcano's* and *Burning Mountains*, which often ſend forth ſuch great Quantities of Sulphureous Vapours that they never fail forming of Clouds: A late Inſtance of which we had given us in a Public News-paper call'd *The Evening Poſt*, N° 2855 —— *Oct.* 10,

Oct. 10. 1727. About Four in the Afternoon it was obſerv'd that Mount VESUVIUS (which during two Days had vomited, without Intermiſſion, Torrents of blazing *Bitumen*, both out of its principal Mouth, and out of thoſe which are on one Side) was wholly cover'd over with very dark and thick Clouds, which moving gradually towards the City of *Naples*, ſurrounded it with Darkneſs: At the ſame time there was ſome Rain and Thunder, but both inconſiderable. About Ten in the Evening the Claps of Thunder increas'd, the Air was inflam'd and darted Fire, by which the Houſes were much damag'd, and ſeveral Perſons ſorely hurt. This was follow'd for the Space of four Hours with ſuch *prodigious Showers* of *Rain*, that it look'd as if all the Ciſterns of Heaven had been open'd to deſtroy the aforeſaid miſerable *City* and the neighbouring Villages, *&c.* whoſe Inhabitants were thrown into unſpeakable Conſternation at the Sight of the Danger they were in ——

Another Inſtance we had from another News-paper call'd *The Whitehall Evening Poſt*, N° 2263. —— *Sept.* 15. 1732. At *Lisbon*

Lisbon in *Portugal*, there was a moſt dreadful Storm of Rain, Thunder and Lightning, which ſet Fire to the Great Tower of the Caſtle there, and blew up the Magazine of Powder, in which there was little leſs than 120,000 *lb.* Weight beſides a great Quantity of Bombs and Grenades all fill'd. The Blaſt of which Powder was ſo violent that the whole Caſtle, with the four Low Towers, were blown up into the Air, and above three Parts of the Town entirely deſtroy'd, and above 600 Perſons buried in the Ruins. After this there was a Succeſſion of *Wet* and Tempeſtuous Weather for a Month.

This may ſuffice to ſhew what a Diſpoſition there is in Sulphur and Nitre to create *Rain.*

The like Obſervations might be made from large and ſtrange METEORS ſometimes ſeen in the Sky. To inſtance in one, in the Year 1668. the famous Antiquary Mr. ANT. WOOD ſays that he and ſeveral other Gentlemen were at Sir JOHN AUBREY's Houſe at *Borſtall*, *Bucks*, *May* 16, when a *Draco volans*, in Shape like a tall Spire Steeple, was ſeen about

Ten

Ten o' Clock at Night to fall from the Sky. It made the Place ſo light for a time that they cou'd ſee to Read, and when it came to the Lower Region, it vaniſh'd into Sparkles, making a Report. *Great Rains* (ſays he) and Inundations follow'd.

I might ſtill add, that this Opinion receives farther Confirmation, every Year, from the *March* Winds that never fail producing *April* Showers. For the Sun's Heat being very powerful about the Time of the Spring Solſtice, unlocks the Pores of the Earth that the Winter Cold had ſhut up, and ſo lets looſe great Quantities of Nitrous and Sulphureous Vapours into the Air, which are the Cauſe of what we call *March* Winds, and after they are got up into the Superior Regions, are there by the Cold of thoſe Regions naturally condens'd into Showers of *Rain*.

In a Word, How often may we obſerve, that after a few ſultry Days in the Spring or Summer-time, when the Sun has extracted good Quantities of Nitrous and Sulphureous Vapours, they quickly fall down again in Showers of *Rain*: And

that Rain-water is impregnated with Sulphur and Nitre, is evident to any one that has not loſt his Senſes, I mean thoſe of Taſte and Smell.

Thus having given my Opinion concerning the Cauſe of *Great* and *Continu'd Rains*, I conclude this Topic with this Quære, *viz.* Whether or no (if we ſhou'd make Obſervations on former Seaſons) one might not date the Unſeaſonableneſs of the Seaſons of late Years, from the Time of the Invention and Uſe of *Gun-powder*, 300 Years ago? But this Piece of Work I wou'd willingly leave to the *Philomaths* of this Age.

Another Eſſay towards accounting for the Cauſe of an Aurora Borealis, *or ſtrange Appearance in the Air*, Mar. 6. 17$\frac{11}{16}$.

LATE when the Sun *roll'd down the* Weſtern *Way,*
His Chariot ſhining with a fainter Ray,
The Silver Moon *appear'd ſerenely bright,*
And o'er the Globe diffus'd a keener Light;
The Planets *and illuſtrious* Stars *were ſeen,*
In myſtic Circles dancing round their Queen:
A ſtrange Appearance *fill'd us with Surprize,*
The Dread of Hearts, and Wonder of all Eyes!

The

The Skies unclos'd, and with prodigious Light
Encreas'd the Luſtre of that Starry Night;
Thro' the wide Hemiſphere, with ſudden Blaze,
It darted to the South *its ſtranger Rays;*
As tho' the Sun (*who lately roll'd away*)
Return'd afreſh, his Glories to diſplay,
And gild our Region with a ſecond Day.
So dreadful lately did the Lights appear,
Which ſpread o'er all the Northern *Hemiſphere;*
When Sol *retiring to his Weſtern Bed,*
Shot from his Source of Fire a deeper Red;
One ſudden Flaſh ſucceeds, as one expires,
And Heav'n ſhot thick its momentary Fires.

March 6th 17$\frac{1}{16}$, in the Evening, was obſerv'd in the Firmament, in moſt Parts of *Europe*, a very ſurprizing *Phenomenon*, call'd by the Naturaliſts AURORA BOREALIS, which tho' not ſo rare in more *Northern* Climes, is very ſeldom ſeen in our *Southern* Parts, and is generally of leſs Duration where more frequent, (and yet oftner ſeen in theſe *Southern* Parts of late Years than ever). The Occaſion of which I ſuppoſe to be thoſe vaſt Quantities of Sulphur and Nitre ariſing from the continual Exploſion of ſo much Gun-powder (over and above what are exhal'd out of the Earth) in Times of War, which have been more frequent in theſe Parts of the

World than ever). If it be objected, that I give the ſame Reaſon for theſe Coruſcations as for Rain ; I anſwer, The Caſe is different ; for Rains are always form'd in the groſs Atmoſphere, but theſe Coruſcations are made in the Pure *Æther* beyond the Atmoſphere, or at leaſt beyond the Verge of the Atmoſphere.

In the *North-Weſt* was obſerv'd a ſmall Cloud (if it might be ſo call'd), or rather a Gathering in the Sky, having ſomething Particular in its Colour. After ſome time it began to labour and curl, and made many extraordinary Motions and intervolving Turns within itſelf. In five or ſix Minutes after it had work'd in this manner within it ſelf, folding (as it were) and unfolding, it ſeparated it ſelf into long and broad Streams of Light, *Coruſcation* or *Fulgor*, iſſuing out of the aforeſaid darkiſh Cloud or Fund of Vapours (about 25 or 30 Degrees above the Horizon, *North-Eaſt* as near as cou'd be gueſs'd) reſembling the Beams of the *Sun* ſetting in a drizling Evening, the Streams pointing directly towards the *Zenith*. It was the more aſtoniſhing, conſidering the *Sun* had

had been more than an Hour ſet, and the *Moon*'s. Riſing not being till Morning. Preſently after ſome other Streams or Pyramids of Light iſſued out of the ſame Cloud, near to the former, with a very unuſual Light, and with Variety of Colours, Black, Blue, Flame-colour, Yellow, *&c.* and ſo more and more, till all that Part of the Heavens was over-ſpread. Theſe *Bright Beams* ſeem'd to make their way, one after another, Regularly enough into the *Weſt*. When they were all poſted in the *Weſt*, of a ſudden, after one another, they ſhot almoſt directly *Eaſt-wards* (and avoided the *South* entirely) and this they did with the utmoſt Precipitation and Celerity. In the *Eaſt* they appear'd Higher-colour'd than they did in the *Weſt*; but retain'd ſtill for a little while the Reſemblance rather of *Columns of Light* than of Fire-beams. At laſt they began to wheel about, and intermingle their Points, and made ſuch violent and quick Vibrations among one another, that it was not poſſible to find out the Order of their Motions. This Hurly-burly of Confuſion was about Seven o' Clock in the Evening,

Evening, and more eſpecially about the *Zenith*, and laſted about an Hour and Half; from the Violence whereof on a ſudden burſt out a very great *Party-colour'd Flame*, which ſeem'd to be double and folding in upon it ſelf with great Vehemence and Fury. Thro' all that diſturb'd Region of the Air, the *Stars* appear'd clear, as thro' a thin bright Smoak, or as the *Sun* ſometimes thro' a thin bright Cloud. The other Part of the Heaven toward the *North-Eaſt* and *South-Eaſt*, was very clear, the *Stars* bright and twinkling as in a Winter's Cold Night when there is no *Moon*. About Nine o'Clock at Night theſe *Meteors* in a great meaſure diſappear'd, but not quite: Some faint ſort of Contentions and Undulations were ſtill perceiv'd from the *Eaſt* to the *North*: And about Ten o'Clock they broke out again with freſh Violence, and darted to the *Weſt* in the ſame manner as before, and thence to the *Eaſt*, and ſo continu'd till about Half an Hour paſt Eleven, and then they retir'd from the *Eaſt* to the *North* again: About Twelve a bright *Globular Body* appear'd as big as,

and

and like the *Sun* at his Riſing, but not quite ſo clear. During this Time, the Light was ſuch that one might plainly ſee to Read. The Night was calm, not ſo much as a Breath of Wind was perceiv'd. About Three the next Morning, the *Coruſcations* by degrees ceas'd, and the *Great Light* in the *North-Eaſt* exactly reſembled the *Dawn of Day*, ('tis frequently ſeen in the Morning in the *Northern* Parts of *Europe*) and therefore call'd AURORA BOREALIS.

For then ſmall Sparks appear'd, and ſcatter'd Light
Broke ſwiftly forth, and wak'd the ſleepy Night :
The Night amaz'd began to haſte away,
As if thoſe Fires were Beams of coming Day.
CREECH's Lucret.

Now the Natural Cauſe of this *Phenomenon* I take to be a vaſt Quantity of *Nitrous* Particles exhal'd from the *melted Snow* (an unuſual Quantity of which we had in the Winter time) together with an Exhalation of a great Quantity of *Sulphureous* Particles, which had been long lock'd up in the Pores of the Earth, and upon the Melting of the *Snow* rais'd up into the Middle Region of the Air (otherwiſe this

this *Phenomenon* cou'd not have been ſo univerſally ſeen, as it was, in all Parts). Theſe *Nitrous* and *Sulphureous* Particles being exhal'd in thin Vapours by the Heat of the *Sun* and other *Stars* into the Middle Region, were by degrees condens'd by circumambient, but thin and tranſparent, Clouds together with the Coldneſs of that Region, till at laſt they became a ſtrong compacted Body, — *Vis unita fortior.* This reſtleſs and rebellious Spirit of *Nitre and Sulphur* in Conjunction, growing ſtronger and ſtronger, and altogether impatient of Reſtraint, was for a long time ſtruggling for Liberty; till at length, partly by the kind Influence of the rarifying *Sun*, removing the Frontiers, and ſo making Way for the preſſing ambient Clouds to fall back; and partly by its own proper Force and Motion, fir'd with a turbulent and reſtleſs Spirit, it burſt thro' all Obſtacles (the finer Part of it taking Fire firſt) diſplaying it ſelf in flying Colours, in long *Streams* of *Light*, and here and there aſtoniſhing *Coruſcations*; to the no ſmall Amazement of the Lower World, many of whoſe ignorant Inhabitants ſtood behold-

beholding the Wond'rous, becauſe Unuſual Sight.

'Tis not without good Reaſon, that Dr. HALLEY aſſumes the Effluvia of the *Magnetical Matter* for this Purpoſe, ſince 'tis evident that our Globe of Earth is no other than One Great *Magnet*, and theſe *Auroræ Boreales* are ſeldom ſeen but in the *Polar* Regions of the World, and that moſt commonly in the Winter Months.

Theſe *Bruta Fulmina*, this harmleſs *Thunder* and *Lightning* in the Middle Region of the Air, bears ſome Reſemblance with the Common *Thunder* and *Lightning* in our groſs Atmoſphere: And no doubt but this Unuſual Lightning was attended with ſome *Noiſe*, tho' little, and not heard at this Diſtance, becauſe out of the Verge of our Sphere, and beyond the Convexity of our Atmoſphere. (That extraordinary *Meteor* of *March* 19. 1718. was computed by the Learned and Accurate Dr. HALLEY to be ſixty-nine Miles above the Surface of the Earth). And no doubt but the Matter of Both theſe Sorts of *Thunder* and *Lightning*, both in the Lower and Middle Region of the Air were the

ſame, and even the Manner of their Generation the ſame, only thoſe in the Upper Region were certainly generated of greater Quantity of Exhalations, and charg'd with greater Quantity of *Nitre* and *Sulphur*, and conſequently were rais'd the Higher. They differ only as to the Manner of *Lightning* and Illumination. Thoſe *Lightnings* that happen in the Lower Region, are ſtruck and darted upon the Earth all at once, I mean every ſingle Flaſh at one Stroke, and ſo all its Matter is ſcatter'd and diſpers'd and hinder'd from rallying again: But the *Lightnings* in the Upper Region being not darted againſt any Hard Body, are ſeveral times recollected. Theſe have a larger, finer, and more unconfin'd Space of Air for Expanſion and Exploſion. Theſe are ſhot, with the utmoſt celerity, a great many Miles at one Flaſh (according to the Strength and Quantity of the *Aerial Gunpowder* they are charg'd with) and then the remaining Matter is detain'd, embarraſs'd and involv'd within ſome diſtant and condenſing Cloud for ſome time, as the whole Matter was at firſt, till at length they rally and burſt out again in the ſame Manner

Manner as before, and perform another Stage, and after that another, and perhaps another, till their Force being almoſt ſpent in ſuch long Journeys, their Vibrations grow fainter and fainter, and conſequently ſhorter and ſhorter, they at laſt terminate in a General Illumination of rarify'd Air, like the *Dawn of Day*, and ſo call'd AURORA BOREALIS, as I ſaid before. To this we ſeem to have the concurring Opinion of the Learned GASSENDUS (in Tom. II. *Phyſicæ*, p. 109.) — *An, ut Cauſa utcunque dicatur, prodeunt aliquando è Terrâ Vapores ejuſmodi, ut longè ultrà Atmoſpheræ Convexitatem erumpentes, ad illam uſque Coni umbræ Terrenæ Regionem pertingunt, quam refracti Radii* Solares *ſic diluunt, ut ſi qui Vapores in illam incurrerint, poſſint, illuſtrati his Radiis,* AURORÆ *ſpeciem exhibere?*

The Reaſon of all the *Flaſhes of Lightning* darting in the ſame Tract, is the rarify'd Air caus'd by the firſt Flaſh. For a ſmall Quantity of fore-running Particles breaking Priſon firſt, and ſetting out before-hand, prepar'd the Way for the reſt by

clearing the Air, and ſo caus'd thoſe faint *Coruſcations* which preceded thoſe more terrible and aſtoniſhing Flaſhes of Lightning.

If it ſhou'd be objected againſt this Opinion of mine, That *Nitre* is a Cold Body, and therefore cou'd not be any Conſtituent Part of this Hot and *Fiery Meteor* I ſpeak of. Let us ſuppoſe the Suppoſition juſt, yet *Nitre* and *Sulphur* mixt together, muſt be allow'd to be Inflammable; and if the Objector had but Courage enough to place himſelf at the Mouth of a fir'd Cannon charg'd with ſuch Ingredients, he might quickly be convinc'd by Experiment. But not to put him to ſo much Danger, 'twill be ſafer for him to apply himſelf to that Learned Naturaliſt Mr. BOYLE for Conviction, who in his *Experimental Hiſtory of Cold*, (*Tit.* 17. *Sect.* 8.) confutes GASSENDUS, who aſcribes the Frigorifick Virtue of Bodies to the Admixture of *Nitre*. Tho' I allow *Nitre* (ſays he) to be a Subſtance diſpers'd thro' moſt Bodies, yet, ſince *Cold* is only a Privative Quality and an Abſence of Heat, there are other Agents, which by ſtopping the Motion of the

the insensible Parts of a Body, may deprive it of its Property of Heating. And tho' GASSENDUS asserts, that Bodies receive the Impressions of *Cold* from *Nitrous* Exhalations swimming in the Air; yet amongst all the Experiments I have made to resolve *Nitre* into Vapours, I have not found that it was able to effect more in the Production of *Cold*, than any other Saline Bodies. And Spirit of *Nitre* is so far from having an actual *Coldness* greater than any other Bodies, that it is potentially *Hot*. And whether the Exhalations of *Nitre* will congeal Water or not, *Spirit of Nitre*, I have observ'd, will dissolve Ice, as soon almost as *Spirit of Wine*: And tho' *Nitre* mixt with Snow or Ice may promote Congelation, yet it proves not that the Parts of *Nitre* are *frigorifick*; since the Experiment will succeed with *Spirit of Wine*—Thus far that Excellent *Naturalist*.

Let us now compare what has been said upon our *Phænomenon* which appear'd lately, with a like *Phænomenon* that appear'd about a hundred Years ago, and is describ'd by the afore-mention'd Learned GASSENDUS, in his Chapter *De* AURORA BOREALI,

BOREALI, & *Ignibus noctu per Aerem diſcurrere viſis.* Tom. ii. *Phyſicæ*, p. 107. *&c.*

Circa *Fulgorem* mirabilem, qui aliquando Nocte intempeſtivâ & ſilente *Lunâ*, totum *Septentrionalem* Tractum ita occupat, ut claram AURORAM mentiatur, unde & AURORA BOREALIS ab aliquibus dicitur. Quædam *Phænomenorum* (inquit SENECA) tantum Lucis emittunt, ut fugent Tenebras, & *Diem* repreſentent, donec conſumpto Alimento, primùm Obſcuriora ſint, deindè *Flammæ* modo, quæ in ſe cadit, per aſſiduam diminutionem redigantur in nihilum. Tale *Phænomenon* apparuit Anno 1621. *Sept.* 12.

Sunt quatuor modi horum *Phænomenorum* generandorum, qui ab EPICURO recenſentur. Unus non prorsùs improbabilis eſſe videtur, ut habens quidpiam ſimile cum *Fulminum* Generatione. Scilicet ejuſdem generis Materies ſic aſcendere ſursùm debet, ut non grandi quidem & condensâ Nube, ſed tenui tamen nec ſerenitatem conturbante Nebulâ (nempè tales aliquæ ſunt ex quibus ſæpè vidimus concreſcere ſpontè in ſereno Nubes) ut, inquam, tenui Nebulâ (quaſi amictu quodam) contineri debeat, quouſque Sublimè evecta, intra eam volvatur, incaleſcat, ex quâ parte tenuior, amiculuſque fragilior fuerit, accendatur, erumpat, ac interim Ignis reliquam Materiam, ob ſui lentorem, ſeu tenacitatem non ſtatim depaſtam, in reſiduam partem amiculi urgeat, avolantemque, ut continens ſui pabulum inſectaretur, quouſque eâ planè conſumptâ, ipſe extabeſcat, & viſibilis fieri deſinat.

Albor ille, ſive AURORÆ ſpeciem æmulata Claritas, apparuit mihi ad *Boream*; ſic ad *Boream* quoque apparuerit quibuſcunque conſpicua fuit, nemini verò prorsùs

prorsùs ad *Auſtrum*. Stuporem adauget, vel ex eo quòd cum Materies *Phænomeni* fuiſſe pertenuis Vapor videretur, oportuerit talem Vaporem eſſe aut immenſæ Diffuſionis Secundum Terræ Superficiem, aut immenſæ Altitudinis, ut nihil Superficiei Terræ Devexitas obſtiterit, quò minùs è Locis adeò diſſitis eodem in ſitu conſpiceretur: ac tantò magis, ſi ulteriùs & in extremum uſque *Septentrionalem* fuit *Phænomenon* propagatum.

i. e.

Concerning thoſe wonderful Flaſhes of Lightning, *that ſometimes in a quiet and dark Night ſo enlighten all the* Northern *Part of the Sky that it reſembles a clear* Morning, *and is therefore call'd by ſome* AURORA BOREALIS, *or the* NORTHERN MORNING. *There are ſome* Phænomena *or* Meteors (*ſays* SENECA) *that ſend out ſo much Light, that they diſpel the Darkneſs of the Night and repreſent the* Day, *till after their Aliment was ſpent, their Light began to grow dimmer, and at laſt like a Flame by continual Diminution was wholly extinguiſh'd. Such was the* Phænomenon *that was ſeen* Sept. 12. 1621.

EPICURUS *reckons up four Ways whereby theſe* Phænomena *come to be generated. One of which is not altogether improbable, as being ſomething like the Generation of Common* Thunder *and* Lightning. *For the Matter of this Sort of* Meteors *ſhou'd aſcend Upwards ſo as not to be involv'd in any great or thick Cloud, but only a thin and tranſparent one* (*like thoſe we often ſee form greater Clouds in a clear Sky*), *I ſay, the Matter ſhou'd be contain'd in ſome little thin Cloud, till being rais'd up High it be involv'd in it, and grows Hot, and takes Fire at the thinner and weaker Part of the Cloud,*

Cloud, burſts out, and in the mean time this Combuſtion forces the reſt of the Matter (that is not preſently conſum'd by reaſon of its Viſcoſity) into the other Part of the Cloud, and follows it flying off as containing its Aliment, until ſuch time as that Matter is quite conſum'd, and it ſelf is extinguiſh'd and becomes inviſible.

That Light *or* Coruſcation *that reſembled the* Morning (*ſays* GASSENDUS) *appear'd to me in the* North; *and ſo it did to every body that ſaw it; but no body ever ſaw it in the* South *Quarter. 'Twas the more ſurprizing upon this account, becauſe ſince the Matter of this* Phænomenon *ſeem'd to be but a very Thin Vapour, it was neceſſary that That Vapour ſhou'd be either of a vaſt Extent to anſwer the Superficies of the Earth; or elſe of a vaſt Height, that the Devexity of the Superficies of the Earth ſhou'd not hinder its being ſeen in the ſame Situation from Places ſo far diſtant: and ſo much the more, if this* Phænomenon *had ſpread farther even to the utmoſt Parts of the* Northern *Quarter.*

It may not be improper in this Place to add to this (by way of further Explanation of theſe Matters) the Accounts that are given of *Igneous Meteors* by the Learned Dr. WALLIS, Dr. WOODWARD, Dr. ROBINSON, Dr. PLOT, and Mr. MORTON.

Dr. ROBINSON (in LOWTH. Abridg. of the *Philoſ. Tranſ.* Vol. V. p. 128.) ſays he is of Opinion, that thoſe *Phoſphorous* or *Luminous Appearances* in the Firmament proceed

proceed from the various Effluvia perſpir'd out of our Globe, or paſſing thro' it; for I have ſeen thoſe Lights over *Veſuvius*, the *Strombulo* Iſlands, and towards *Ætna*, in dark Nights, when thoſe Volcano's were not flaming nor burning, their Sides and Tops being paſſable to Travellers at that Time, and all their Outward Parts quiet. We are certain that *Iceland* and *Greenland* abound with Vulcano's; ſo may North-Eaſt *Lapland*, North *Ruſſia* and *Tartary*, where vaſt Chains of Mountains are ſaid to run. The *Jeſuits* and other Travellers relate many prodigious Eruptions of *Fires* and *Earthquakes* towards the North of *China*; but nearer the *Pole* the Earth muſt be clos'd and pent up many Months, by the long ſevere Freezings and continual Snow and Ice, which relaxing towards Spring, may give Vent to that vaſt Maſs or Magazine of perſpirable Matter, that had been kept ſo long in Hot Subterraneous Priſons. This may be one Reaſon why Animal Bodies themſelves are often ſenſible of Changes at that Seaſon in our Climate, when Perſpiration is upon ſuch an Increaſe.

Mr. MORTON's Opinion of *Igneous Meteors*, is (as he tells us in his *Nat. Hiſt. of Northamptonſh.* p. 343.) That they are form'd of Mineral Exhalations, as Thunder and Lightning. The Cauſe whereof is eſpecially *Nitre and Sulphur*, rais'd out of the Earth by a conſiderable Degree of Heat, and thence born up by the like Degree of Heat into the Atmoſphere, where they conſtitute a kind of *Aerial Gunpowder*. And what Dr. WOODWARD (in his *Nat. Hiſt. of the Earth*, p. 205, 206.) ſpeaks with ſo much Clearneſs concerning the *Fulminating Damps*, is fitly applicable to this Sort of *Meteor*; the Matter of both being the ſame; and that differing from this in this reſpect only, or chiefly, that the Matter of the *Fulminating Damp* is ſuſtain'd in the Air of the Mine or Coal-pit by a Leſſer Degree of Heat, this of *Lightning* is taken up into the Atmoſphere by a Greater Degree of Heat. And give me leave to add, that the Matter of the AURORA BOREALIS was exhal'd into the Middle Region by a ſtill Greater Degree of Heat, otherwiſe it cou'd not have made its Way thro' the Atmoſphere, and

ſo

ſo got into a Higher Region, above forty Miles diſtant from our Earth.

This *Mineral Matter* which ariſes in Separate Parcels from the Earth, and in a conſiderable Quantity aſſembling more Cloſely in the Atmoſphere, becomes, upon being enkindl'd by the Heat that then accompanies it, a quick, active, and forcible Fire, which ſtriking thro' the ambient Air, or thro' the Cloud that encompaſs'd it, with great Celerity, is what we call *Lightning*, as the Cloud and great Noiſe that uſually attends it, has the Name of *Thunder:* Whereof the Cauſe is the Diſcharge or Exploſion of this Fire from a Cloud; which as it is more or leſs Compact, and the Fire breaking forth of it more or leſs Forcible, the Noiſe is accordingly greater or leſs. When a great Quantity of this inflammable Matter is aſſembl'd, and takes Fire at once, it occaſions a Noiſe like that of ſeveral Great Guns diſcharg'd at one and the ſame Time. When it lies in a thinner and more diſpers'd Collection, or in ſeparate Parcels, and is by little and little, or ſucceſſively attended, it occaſions a Noiſe reſembling that of Peals or Vollies

which are made by a *Running Fire* (as they term it) of ſeveral ſmaller Guns diſcharg'd in a Train one after another. When the Cloud is of ſuch large Extent, and withal ſo compact that the Fire, tho' ſtrong, is unable to break thro' it, it occaſions a deep and rolling Noiſe, not attended with *Lightning*, the Fire being ſpent by Degrees in the Boſom of the Cloud.

There are other more harmleſs METEORS of the *Fiery* Kind (ſays Mr. MORTON, p. 348.) which are not to be paſſed by without ſome Remarks. *Sept.* 20. 1676. about Seven at Night, was ſeen an unuſual *Meteor*, by ſome call'd *Draco volans*, in *Northamptonſhire*, and the Neighbouring Counties; whereof we have a ſhort Account from Dr. WALLIS (in the *Philoſ. Tranſ.* N° 135. p. 863.) About Seven at Night (ſays he) appear'd a ſudden *Light*, equal to that of *Noon-day*, ſo that the ſmalleſt Pin or Straw might be ſeen lying on the Ground. And Above in the Air was ſeen (at no great Diſtance, as was ſuppos'd) a Long Appearance as of Fire, like a Long Arm (for ſo it was deſcrib'd to me) with a great Knob at the End of it; ſhooting

ing along very ſwiftly : And at its Diſappearing ſeem'd to break into ſmall Sparks, or Parcels of Fire, like as Rockets and ſuch Artificial Fire-works in the Air are wont to do. 'Twas ſo ſurprizing, and of ſo ſhort Continuance, that it was ſcarce Half a Minute. This Fiery Meteor might be a *Draco volans*, or ſome *ſmall Comet*, becauſe it was ſeen in moſt Places in *England*. Dr. PLOT (in his *Nat. Hiſt. of Staffordſh.* p. 20.) calls this Meteor *Capra Saltans*, which (as it was deſcrib'd to him) appear'd like a Great Fire at a diſtance, but coming nearer, its Form and Motion were plainer, it being of a Globular Figure, moving by Jerks, and making ſhort Reſts, at every one of them letting fall Drops of Fire, which were Part of its Body, for it decreas'd in Magnitude the farther it went, and the oftner it drop'd ; ſo that it wholly diſappear'd at about three Quarters of a Mile diſtance.

The ſaid Mr. MORTON proceeds to give us an Account of ſome more *Meteors*, one that was obſerv'd in *Sept.* 1693. the Top of which was in the Form of the Letter W, and had a Liſt or String of Light appendant

dant to the lower Part of the W, about a Yard and Half in Length. It continu'd ſome Time, and was ſeen by ſeveral round the Country.

In *Aug.* 1699. was obſerv'd a *Globe of Fire,* of ſurprizing Brightneſs and Magnitude, in the *Weſtern* Part of the Hemiſphere, a little after Sun-ſettting. It ſtruck downwards in an Oblique Line, and diſappear'd when it came almoſt as low as the Horizon. In or near the Place of it, there ſucceeded a narrow Liſt or Stream (as it were) of a *Fiery Smoak,* about 35 Degrees in Length, which continu'd compact and unbroken for the Space of almoſt two Hours. Towards the Cloſe of it, it became ſomewhat Winding or Curled. At length it was broken or diſpers'd by Clouds that paſs'd that Way.

Somewhat more obſervable are thoſe ſeeming Burnings of the Air, or *very bright Illuminations* which the two following Relations inform us of. At *Higham-Ferrers* in *Northamptonſhire, Jan.* 28. 1699. about Half an Hour paſt Five in the Morning appear'd on a ſudden a more than ordinary Light, like a Flaſh of Lightning, but

but of longer Continuance, much outſhining the Light of the *Moon*, which till then was clear. It continu'd over *Higham* about the Space of a Minute, and ſeem'd to move from *Eaſt to Weſt*. And about Five o' Clock that very Morning was ſeen at *Plymouth* a prodigious Light in the Firmament, of which perhaps this in *Northamptonſhire* was a Part.

The other Relation is as follows: *Dec.* 18. 1707. About Eight o' Clock at Night, the Wind being *Weſtward* (a brisk Gale) and the Sky ſerene and clear, there appear'd at *Fenſhed* in *Northamptonſhire*, a *Brightneſs in the Air*, which made an Arch from *North-Weſt* to *North-Eaſt*, equal to that which the *Sun* makes at the Winter-Solſtice, extending it ſelf from nigh the Bottom of our Hemiſphere to nigh the two Pointers of *Urſa major*. The Light was pale and of a Silver Colour, ſo light that all the *Stars* within the Compaſs of it, unleſs one or two of the firſt Magnitude, were not to be perceiv'd, being obſcur'd by the Greater Light, which, as far as it extended, was equal to that of the Day. There was a dark Cloud which lay (as it

ſeem'd

ſeem'd to us) along the Horizon, from one End of the Brightneſs almoſt to the other, and about Half a Degree Diameter. There was another long dark Cloud, of a Cylindrical Figure, which lay Horizontally, and ſeem'd to divide the Brightneſs into two almoſt equal Parts. It had little or no Motion, tho' the Wind blow'd briskly. But on a ſudden there appear'd a ſwelling Brightneſs in that Cylindric Cloud, which broke out into Flames of a Pale-colour'd Fire, that ſpread themſelves very far *Southwards*, and very nigh the Bottom of the *Northern* Part of our Hemiſphere. The Flames laſted not longer than Half a Minute, and then were carried *Eaſt-ward* and ſoon vaniſh'd. It was wonderfully frightful and amazing. The Brightneſs alſo was very ſtrange, and continu'd till Eleven o' Clock.

Somewhat parallel hereto, Mr. Stow (the old Judicious Chronicler) relates from his Own Obſervations. About Mid-night, *Novem.* 14. 1574. *Fire* and *Smoak* were ſeen to proceed from a Black Cloud in the *North.* The following Night the Heavens ſeem'd to be all on Fire; and over our Heads

Heads (says he) the Flames from the Horizon did meet, and there roll one in another as in a Furnace, in a marvellous raging manner.

There is (says Mr. MORTON) no room to suspect the Credibility of the two former Relations, that from *Higham*, and that from *Finshed*. All that I wou'd enquire is, Whether these *Extraordinary Splendors* in the Air do not usually happen at or nigh the Time of *Tempestuous Winds*; the Agent that produces them perhaps bearing forth from the Earth a considerable Quantity of subtiler and purer Igneous Matter, as the Heat which is discharg'd out of the Earth at the Time of Earthquakes, educes and bears up along with it such a Quantity of several Kinds of Mineral Matter, as to thicken, discover, and darken the Atmosphere. (*Vid.* Dr. WOODWARD's *Nat. Hist. of the Earth*, p. 202.) That these *Unwonted Illuminations* appertain to the *Igneous Tribe of Meteors*, appears by several Circumstances, and particularly by that of the Eruption of Flames from out of the Black Clouds. And to me they seem constituted of a thin and

diſpers'd Collection of the Parts of Fire, of Quantity and Strength ſufficient to enlighten the Air, eſpecially if ſerene and clear; tho' not to heat it ſo that the Senſes can diſcover any more than Ordinary Warmth in it, tho' perhaps a *Thermometer* might.

Beſides the AURORA BOREALIS that I have been hitherto deſcribing, we have had ſeveral others, the moſt remarkable of which were thoſe on *Oct.* 8. 1726. alſo the 3d of *March* following, and on *Nov.* 22. 1728.

Notwithſtanding the frequency of theſe ſtrange *Appearances* in the Air, eſpecially in the *Northern* Climes, and in theſe *Southern* Parts of late, yet a certain *Author* publiſh'd a Pamphlet, entituled,

An Eſſay concerning the Apparition in the Heavens, on the 7th of March, $17\frac{15}{16}$. *Proving by Mathematical, Logical, and Moral Arguments, that it cou'd not have been produc'd meerly by the Ordinary Courſe of Nature, but muſt of neceſſity be a Prodigy.*

Now, tho' I wou'd by no means derogate from the Extraordinary Providence of GOD,

GOD, when Things cannot be ſolv'd by the Ordinary Courſe of Nature; yet I ſee no Reaſon why we ſhou'd preſently run to Miracles in explaining Natural Events. For this (as a late Learned Author ſays) breaks the Chains of Natural Providence, when it is done without Neceſſity, that is, when Things are otherwiſe Intelligible from ſecond Cauſes. This is robbing *Peter* to pay *Paul*, and taking ſo much from GOD's Ordinary Providence, to place it to His Extraordinary. Indeed when a New Religion is brought into the World, 'tis very reaſonable it ſhou'd be uſher'd in with Miracles; but afterwards Things return into their old Channel, and do not change or overflow again, but upon Extraordinary Occaſions or Revolutions. The Extraordinary Power of GOD is to be accounted very Sacred, and not to be touch'd or expos'd for Our Pleaſure or Conveniency: But I am afraid we often make uſe of it only to conceal our Own Ignorance, or to ſave us the Trouble of Enquiring into Natural Cauſes. We ought to conſider that the Courſe of Nature is truly the Will of GOD, and (as I may ſo ſay) his Firſt Will;

from which we are not to recede, but upon clear Evidence and Neceſſity. And as in Matter of Religion, we are to follow the Known Reveal'd Will of GOD, and not to truſt to every Impulſe or Motion of Enthuſiaſm, as coming from the *Divine Spirit*, unleſs there be evident Marks that it is Supernatural and cannot come from our Own; ſo neither are we, without Neceſſity, to quit the Known and Ordinary Will and Power of GOD eſtabliſh'd in the Courſe of Nature, and fly to Supernatural Cauſes, or his Extraordinary Will; for this is a kind of Enthuſiaſm, as well as the Other: And no doubt that great Prodigality and Waſte of Miracles which ſome make, is no way to the Honour of GOD and Religion. 'Tis true, the other Extreme is worſe than this, for to deny all Miracles, is in Effect to deny all Reveal'd Religion; therefore due Meaſures are to be taken betwixt theſe two, ſo as neither to make the *Divine Power* too mean and cheap, nor the *Power of Nature* Unlimited and All-ſufficient.

Nor is this Opinion of making a Prodigy of a meer Natural *Phænomenon*, culpable only

only upon a *Religious*, but alſo upon a *Civil* Account. For if it be reckon'd a Prodigy and ſome Wonderful Thing, predicting ſome Ill Accident to the Nation in which we live, it may be of very Bad Conſequence. Tho' why it ſhou'd not be reckon'd a Good Omen, as well as a Bad One, or why it ſhou'd not be Ominous to any other Nation as well as Ours (ſuppoſing it obſerv'd in Other Nations as well as This) I cannot imagine. I ſay, ſuppoſing it reckon'd a Bad Omen to This Nation (moſt People being apt to fear the Worſt) how muſt we ſuppoſe Peoples Minds prepoſſeſs'd with ſuch an Opinion? How wou'd they be (as it were) Planet-ſtruck with a Panick Fear? How fatally Aſtoniſh'd and Diſhearten'd? Inſomuch that ſhou'd we ſuppoſe a Foreign Prince or Potentate to re-invade us, How fluſh'd (hereupon) with Hopes of Succeſs might the Invader be? And how diſmay'd, and already Half-overcome with Fear, the Invaded? And ſo this Suppos'd-Ominous *Phænomenon* be as Bad, as MERLIN's Prophecy heretofore was of Good Conſequence to this Kingdom. For we are in-

form'd

form'd by Mr. CAMDEN, that this Old Britiſh Prophet propheſied, That when a Stout *Prince* with a freckled Face, ſhou'd paſs over the Ford call'd *Ryd-pen-carn*, being in a River call'd *Nant-pen-carn*, the *Welſh* ſhou'd be ſubdu'd. Which accordingly came to paſs; for King HENRY II. who paſs'd over this Ford, was Freckle-fac'd; and as ſoon as the *Welſh* heard where the King came over, their Hearts fail'd them, becauſe of this Prophecy; and ſo they ſubmitted thro' too much Credulity. It is not impoſſible, that King HENRY might chooſe to go over at this Ford in Strength of this Prophecy, and his Enemies Credulity, the more to facilitate his Conqueſts. *Vide* WHISTON's *Account* of this *Meteor*, p. 74.

And as the making theſe *Phænomena* and unuſual Appearances in the Air, to be (I know not what) Miracles and Prodigies, is very *impolitick*, becauſe oftentimes of dangerous Conſequence to the State; ſo likewiſe the imagining ſtrange Appearances of Military Skirmiſhes in the Air, or Armies of Aerial Warriors diſputing in Battle-Array for Victory, is very *Fooliſh* as well

as

as *Fanciful*, tho' ſo ſeriouſly mention'd by ſome of our Old Hiſtorians, and too creduouſly believ'd by the Vulgar. All thoſe fancied Figures of Armies fighting in the Air, and ſuch-like ſtrange Prodigies, being nothing elſe in reality, but ſo many ſmall Clouds of odd, and ſometimes indeed of ſtrange Shapes, together with Balls and Darts of Fire, or fiery Streaks and Waves, Lightnings and Coruſcations, terrible enough to the ignorant Spectators. This is the Whole of the Matter, and all the reſt nothing elſe but Creatures of their own Brain, and the Product of their own Superſtitious Imaginations.

But not to inſiſt upon Generals; let us come to Particulars. The Author of the aforeſaid *Pamphlet* endeavours to prove that late *Phænomenon* in the Heavens to have been a *Prodigy*, by Logical, Moral, and Mathematical Arguments. The bare mention of his Logical and Moral Arguments may be ſufficient.

His Logical *Argument*, pag. 16. *runs thus*;

All thoſe Things ought in Reaſon to be accounted Prodigies, to which we can define

fine nothing to be ſuperadded, in order to their being diſtinguiſh'd for Prodigies, and which we can only explain to be poſſibly Natural; without any other Foundation of a Proof than meer Gueſs and Divination.

Therefore it ought in Reaſon to be accounted a Prodigy.

His Moral *Argument thus*;

'Tis agreed on all Hands by the Moraliſts, that the moſt Probable Opinion is to be follow'd.

Now the moſt Probable Opinion for Ignorant People to follow is, that This muſt have been a Prodigy.

Conſequently the Opinion that ought to be entertain'd among the Generality of Mankind, is, that it was a Prodigy.

So much, and I think enough, concerning this *Author*'s Logical and Moral Arguments. What I am chiefly concern'd to take notice of, is, the *Minor* of his *Mathematical* Argument, though I ſee no Reaſon why it might not have been properly call'd *Phyſical* Argument, which runs thus;

" That

" That this *Fiery Apparition* did not " act according to the Laws of Nature, is " proved by Fact and Experience of all " that saw it; for after it had Blaz'd, the " Fire went entirely out, and then lighted " again, which is contrary to the Laws of " Nature and Reason; for when it was " lighted, either there was more Aliment " capable of maintaining so bright a Flame, " or there was not: If there was, how " cou'd the Fire Naturally be extinguish'd " as to appear so? If there was not, how " cou'd it Naturally light again into as " bright a Flame as ever, so many Hours " afterwards?"

Now this *Minor* I beg leave to deny, by asserting that our *Phænomenon* or Fiery Apparition, did act according to the Laws of Nature; and that it did so, is prov'd by Fact and Experience of all that saw it; for after it had blaz'd, the Fire went not entirely out: Which I thus prove.

If the *Fire* after it had Blaz'd, went out, and was indeed totally extinguish'd, there must needs have been observ'd something like an Extinction, something of a *Caput mortuum* or Smoak, or as when such-like

Meteors burſt into ſmall Sparks or Parcels of Fire, like Sky-rockets, and ſuch-like Artificial Fire-works in the Air; or like the *Draco volans* (deſcrib'd by Mr. MORTON, p. 348, of his *Nat. Hiſt. of Northamptonſh.*) which mov'd by Jerks and made ſhort Reſts, letting fall Drops of Fire, which were Parts of its Body, as he tells us. This Suppoſition, any Man that is any thing of a Meteorologiſt and in his Right Senſes muſt ſurely grant.

But nothing of all theſe (which are the neceſſary Concomitants of ſuch extinguiſh'd Meteors) was obſerv'd in our *Fiery Apparition* (or Apparitions): But after it had went its Length, *i. e.* after its Elaſticity was ſpent, and a great deal of its Spirit and Vigour unavoidably diminiſh'd (as plainly appear'd by its next ſhorter Stages or Flights) as it at firſt burſt out of one Cloud, ſo afterwards it was ſhot into, and embaraſs'd by another, and again by another, and ſo on.

Therefore I conclude, that the Fire of this *Apparition*, after it had Blaz'd, did not entirely go out, and was not totally Extinguiſh'd, and conſequently that this

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our *Phænomenon* or Fiery Apparition did act according to the Laws of Nature, as is prov'd by Fact and Experience of all that ſaw it, and conſequently ſtill, that the ſaid *Phænomenon* in the Heavens, might have been produc'd meerly by the Ordinary Courſe of Nature, and need not raſhly be deem'd a *Prodigy*.

But after all, notwithſtanding this Great *Phænomenon* does ſeem to be nothing elſe but the Product of meer *Natural* Cauſes, yet ſtill, in Contemplating theſe and ſuch-like Wonderful Works of *Nature*, we are Naturally led from hence to celebrate and admire the *Great Author and Firſt Cauſe of Nature*. For Matter, whether we allow it Motion or not, cou'd not come into that Variety of Tempers and Compoſitions, in which we find it in the World, without the Influence and Direction of a Superior External Cauſe, which we call *The Author of Nature*. Thunder and Lightning are things (tho' eaſily accounted for by Natural Cauſes) that have terrify'd and affrighted the Greateſt Monarchs, and even the moſt Cruel Tyrants, witneſs *Tiberius* and other *Roman* Emperors. To-

tal Eclipſes likewiſe of the *Sun* and *Moon* (tho' their Cauſes are ſo very well known, and their Times and Periods ſtated and fix'd) never fail to excite our Admiration and Praiſes of the Infinite CREATOR and Contriver of them. How much more may ſuch *Uncommon Appearances* force from us ſuch-like Pious Exclamations —— *O* LORD GOD, *Thou art become Exceeding Glorious! Thou art cloath'd with Majeſty and Honour! Thou deckeſt thyſelf with Light, as it were with a Garment, and ſpreadeſt out the Heavens like a Curtain; who makes the Clouds his Chariot, and walks upon the Wings of the Wind!* O LORD, *how manifold are Thy Works! In Wiſdom haſt Thou made them all; the Earth is full of thy Riches!* Pſal. civ.

The Cauſe of the Plague.

MR. Profeſſor BRADLEY (in his Book of *Planting and Gardening*) mentions a Letter wrote to him by an Ingenious Hand, Mr. BALLE, concerning the Origin of the *Plague*, which he ſuppoſes to be *Inſects*

ſects of that extraordinary Smallneſs, that they are not to be diſcerned by the naked Eyes; they are ſo light that they float in the Air, and are ſo ſuck'd in with the Breath. Such *Inſects* not being among us commonly, but only when they are either brought to us from ſome remote Place by the *Wind*, or hatch'd, or nouriſh'd by Intemperance of *Air*, or ſome Poiſonous *Vapours* ariſing from Bogs, Ponds, Ditches, or ſome ſuch unwholeſome Funds of Stagnating Water.

Theſe *Inſects* are various, according to the Nature of the *Water* or *Air* they are bred in; their Eggs being firſt laid by ſome flying Animals, which are then hatch'd, and paſſing through the ſeveral Changes common to *Inſects*, at length take Wing; and being drawn in with the Breath, may perhaps be either kill'd in our Bodies, and cauſe a violent Ferment in the Juices; or elſe finding proper Nouriſhment, they breed in the Lungs, Stomach, or other Parts within us, and probably may occaſion thoſe Biles and Breakings out in the tender Parts of the Body, that are call'd *Plague Sores*.

But

But theſe *Inſects* are ſome of them ſo extremely ſmall, that they are only capable of being diſcern'd with good Microſcopes; and when they are Wing'd and ſo quite perfected, may perhaps in Swarms be carried from one Country to another by the *Wind*. It is *Inſects* of ſeveral Kinds and Colours, which cauſe the Surface of Waters to appear ſometimes *Green*, *Red*, and *Black*; which laſt Colour in Water, is obſerv'd by the Herdſmen to poiſon the *Cattle* that drink of it; and they ſay cauſes the *Murrain*, which is the *Plague* in Cattle, and is very infectious.

It has been obſerv'd, that *Plagues* and the moſt Contagious Diſtempers, have commonly happen'd in thoſe Years, when the *Eaſterly Winds* have more than ordinary prevail'd in the *Spring* and *Summer* Seaſons; then the Air comes to be infected, and rarely or never at other times. Theſe *Winds* we ſee bring Caterpillars, and many different *Inſects* and Flies, which meeting with Places fitly adapted to nouriſh them, they are there brought to their Winged State, which I conceive is the ſame in the inviſible Animals as in the viſible;

viſible; nor indeed is any Part of the Earth or Waters, and it may be the pure *Air* itſelf, free from the Seeds of Life: Nothing is out of Motion, or can be void of it, ſetting forth the Glory and infinite Power and Wiſdom of the CREATOR, from whence theſe infinite Productions proceed; ſome for one Uſe, ſome for another. What we call the Bad, are thoſe, which at Unſeaſonable Times invade by Swarms the Bodies of Living Creatures, to whom they are deſtructive; and cauſes the *Murrain*, *Rot*, and ſuch-like mortal *Diſeaſes*.

Again, that the *Plague* proceeds from living Creatures brought by the *Eaſterly-Winds*, ſeems probable; for that ſuch *Peſtilences* are moſt malignant in the Summer, after the *Eaſt-Winds* of the *Spring* have blown, which paſſing over the Greateſt Continent of the Earth, bring theſe *Inſects* with it; but the contrary Effect has the *Weſt-Winds*, which come to us over the Vaſt *Atlantic* Ocean, attended with great *Rains*. Theſe laſt *Winds* cure the *Plague* (it may be) by carrying the Remainder of thoſe *Peſtiferous Inſects* which yet ſurvive, to the Country from whence they

they came: And Froſt and Snow likewiſe ſtops the *Infection*, perhaps by killing them, or laying them to ſleep till the next Seaſon, when they may be either brought back again by the *Eaſterly-Winds*, or be enliven'd, or freſh Swarms hatch'd by the Temperature of *Air* ſuitable to them.

I have not yet found that any Winds, except the *Eaſt* Winds, ſuch as paſs over *Tartary*, bring any Infection with them; nor have I ever heard of *Peſtilential Diſtempers*, in any Part of the World, unleſs in ſuch Places only where the *Tartarian* Winds reach; *Tartary* being a Country full of Woods, Bogs, and Fens, it ſeems the moſt capable of producing theſe Creatures in abundance, which may be carry'd by the *Wind* to certain Places in Search after their Food, as are Locuſts, and ſome certain Birds, which are known to paſs from one Country to another.

DIODORUS SICULUS, (in his *Hiſtorical Library*, Book xii. p. 286.) ſays, The *Plague* broke out afreſh at *Athens*, when they had been but lately freed from that *Contagion*: It rag'd with that Violence, that they loſt 4000 Foot Soldiers, and

and 400 Horſe; and of others, Freemen and Servants, above 10,000. And now becauſe the Courſe of the Hiſtory may require a Declaration of the Cauſes of this violent *Diſtemper*, it is neceſſary in this Place to ſet them forth.

Abundance of Rain had fallen in the *Winter*, by reaſon whereof the Earth being over-wet (eſpecially in Low and Hollow Grounds) the Water lay in the ſtanding Pools, which corrupting and putrifying by the Heat of the *Summer*, thence proceeded a Miſt of groſs ſtinking *Vapour*, which corrupted the *Air*; and beſides the want of good Food, much advanc'd the Progreſs of the Diſeaſe; for the Year before, the Fruits by too much *Rain* were crude and unwholeſome.

There was likewiſe a third Cauſe of this *Diſtemper*, which was this, the *Eteſian Winds* (which I take to be the *Magiſtrali*, or North-Weſt Winds) blew not this Summer, by whoſe gentle Breezes, the violent Heat of the *Air* was us'd to be allay'd at other Times; ſo that the Heat being now more exceſſive, and the *Air* (as it were) inflam'd, Mens Bodies wanting the uſual

Refreſhment, contracted an evil Habit, from whence aroſe *Burning Diſtempers*; and thence it was that many, ſiez'd with this Diſeaſe, caſt themſelves into Pits and Wells.

When the Plague rag'd in *London* in 1666, the Summer was ſo dry that hardly any *Rains* fell till *November*, which Drought muſt be occaſion'd by an unuſual Frequency of *Eaſterly Winds*.

Experience ſhews us how much *Inſects* delight in Stinking Places, and that they increaſe much faſter in uncleanly Cities, ſuch as *London* was formerly, than in cleaner Places: But the City of *London* having been for the moſt part burnt the Year after the *Peſtilence*, its Streets were enlarg'd, many Drains were made, and good Laws were put in Execution for keeping the City clean, and it has not had any *Plague* ever ſince.

It is remarkable, that when the *Plague* reign'd in *London*, *Buckler's-Bury*, which ſtood in the very Heart of the City, was free from that *Diſtemper*: The Reaſon given for it is, that it was chiefly inhabited by Druggiſts and Apothecaries, the Scent of

of whoſe Drugs kept away the *Infection*; which, according to my Notion, were ſo unnatural to the *Peſtilential Inſects*, that they were kill'd or driven away by the ſtrong Smell of ſome Sort of Drugs. The Smell of *Rue*, and the Smoak of *Tobacco*, were preſcrib'd as Remedies againſt the *Infection*, but eſpecially *Tar* and Pitch-Barrels. Likewiſe the People of *Lime-Houſe* were not affected by it, nor ſome of the *Docks*, perhaps for the ſame Reaſon. So alſo the Uſe of *Sea-coal* may now be one Means to prevent the *Plague* in *London*.

The People of *Leghorn* in *Italy* obſerve, that at the End of every eighteen Years, they are ſubject to an *Epidemical Diſtemper*, which if it be not the *Plague*, is hardly to be diſtinguiſh'd from it. I was there in the Year 1685, when it began about the Beginning of *Summer* with frequent *Eaſterly Winds* (ſuch as are not uſual) continuing to blow almoſt without Intermiſſion till towards *Winter*; much as DIODORUS SICULUS deſcribes the Year to have been when the great *Plague* was at *Athens*; we wanted that *Summer*

our *Maiſtraili* or *North-Weſt* Winds (as we uſed to have) which are the *Trade-Winds* in all the Hot Countries of the World, following the Courſe of the Sun. About Nine or Ten in the Morning theſe Winds begin to blow, and laſt till Sun-ſet, when ſoon follow the Winds from the Shore, which blow till the next Day about Nine, and then the *Trade-Wind* re-takes its Courſe.

The firſt *Infection* began in Houſes near the Walls of the Town to the Land-ward, from whence the *Eaſt-Wind* blew, and by degrees crept towards the Sea; but the Infection did not touch ſuch Places which were inhabited by Merchants and Shop-keepers, who dealt in *Salt* and *Pickled Fiſh*, *Pitch*, *Tar*, and ſuch like Commodities.

To the Northward of the Town, towards the Sea-Shore, lay very Boggy *Stinking Ground. Theſe *Marſhes* commonly about Autumn cauſe *Agues* and *Fevers*, which may be from vaſt Swarms of inviſible unwholeſome *Inſects*, which riſe from thence at that Seaſon, but of a different *Poiſon* from thoſe which cauſe the

the *Plague*. So the like Places about *Civita-Vecchia*, *Scanderoon*, and I may mention the Iſle of *Sheppy* likewiſe, ſeem to cauſe *Agues*. And it is obſervable, that from the Mouth of the River *Magra*, which divides *Tuſcany* from *Liguria*, along the Sea-coaſt of *Italy*, as far as *Terracina*, is very Unhealthy and ſubject to *Agues* and *Peſtilential Fevers*, being *Marſhy* Ground.

We may alſo obſerve, that in *Turkey*, *Ægypt*, and *Barbary*, when the *Plague* rages, the *Franks*, the *Engliſh*, &c. are ſeldom infected with it, which ſeems to confirm my Opinion, that this *Sickneſs* proceeds from *Inſects*, who having their certain Natural Nouriſhments reſpectively appointed them, do not in thoſe Places infect Strangers, who have different Ways of Eating and Living from the Natives, and are of a contrary Nature of Body. It wou'd be well worth Enquiry, if the People of thoſe Nations, that were in Strange Countries in the Times of *Peſtilence*, were alſo free from *Infection*.

King CHARLES II. when he was told of the *Sickneſs* at *Leghorn*, ſaid it muſt have been

been occaſion'd by the *New Fortifications* which were then building in thoſe *Marſhy* Places. And 'tis very rational to believe, that turning thoſe Unwholeſome *Muds*, and expoſing of them to the *Sun*, did much increaſe the *Diſtemper*, by infecting the *Air*, and filling it with greater Supplies of Poiſonous *Inſects*.

I cannot help taking Notice likewiſe of the raging *Diſtemper* which was among the *Cattle* about *London* about thirty Years ago. It was ſo violent and infectious, that if one *Cow* had it, all others that came within Scent of her, or eat where ſhe graz'd, were ſure to be infected. It ſeiz'd their Heads, and was attended with Running at the Noſe and a very nauſeous Breath, which kill'd them in three or four Days. The Herdſmen wou'd not allow it to be the *Murrain*, nor cou'd give any Account from whence it did proceed, or cou'd find out any Remedy againſt it. They only tell us, the unuſual Dry *Summer*, and the continu'd *Eaſt-Winds*, were the Occaſion of it. This *Diſtemper* had been for two or three Years before it came to us in *Lombardy*, *Holland*, and *Hamburgh*, to the

the Loſs almoſt of all their Cattle. The *States* of *Holland* caus'd a Medicine to be publiſh'd for the Good of thoſe who had their *Cattle* thus diſtemper'd; but having been try'd here, it wou'd not cure one in ſeven, but rather increas'd the *Infection*, by keeping the Diſtemper'd *Cattle* longer alive (by ſome Days) than they wou'd have been without it. 'Tis remarkable that no *Oxen* had this *Diſtemper*, but only *Milch Cows*, which were more tender than the *Males*. The Herdſmen, to keep the *Cattle* from the *Infection*, let them blood in the Tail, and rub'd their Noſes and Chops with *Tar*; and when any happen'd to die of it, they were burnt and buried deep under Ground. It began at *Iſlington*, ſpreading it ſelf over many Places in *Middleſex* and in *Eſſex*; but did not reach ſo far Weſtward from *London* as twenty Miles.

The moſt general Opinion concerning the Cauſe of this *Diſtemper*, was, that the *Cattle* were firſt infected by drinking ſome unwholeſome ſtanding Water, where 'tis probable ſome poiſonous *Inſects* were lodg'd and bred; the *Summer* having been extremely

extremely Dry, attended almoſt conſtantly with *Eaſterly-Winds*, the Graſs almoſt burnt up, and the Herbs of the Gardens almoſt deſtroy'd by the *Inſects*; but ſuch as they were (unfit for Table-uſe) were given to the *Cattle*. There was likewiſe ſo great want of *Water*, that many were forc'd to drive their *Cows* five or ſix Miles to it.

The *Electuary*, publiſh'd upon this Occaſion by the *States of Holland*, was compos'd of moſt (if not all) the Drugs us'd in the moſt ſerviceable Medicines that were made uſe of againſt the *Plague* amongſt Men; moſt of which Ingredients we know to be mortal to *Inſects*, as ſtrong-ſcented Roots and Herbs; but above all, Aromatic Gums and Saps of Plants, as *Rue*, *Garlic*, *Tar*, *Pitch*, *Frankincenſe* and *Olibanum*; but I believe, before all others, Extractions from the *Cedar*, nothing preſerving Bodies from Worms better. Theſe Ingredients are much us'd in *France* and *Italy*, to prevent or deſtroy Infection, by burning them, and Smoaking ſuch Bodies, Letters, or any other Things as are brought from infected Places, after they have perform'd

form'd *Quarentine*, and are not ſuffer'd to come on Shore till they have undergone this Operation.

It is not againſt Experience, that *Inſects* can live and increaſe in Animal Bodies. How often do we find Men, Women and Children, troubled with *Worms?* What Varieties of thoſe *Inſects* are often voided by them? And how ſhou'd that be, if they were not either ſuck'd into the Stomach with the Breath, or taken into it with ſome unwholeſome Food? For they cannot breed in ſuch Bodies from nothing, without either their Eggs, or Themſelves are brought thither by ſome Accident: For if they were the Natural Produce of Animal Bodies they wou'd then be alike common to all, which we know they are not.

I have been inform'd that in the Year 1714, when this *Mortality* among *Cows* was at its Height, that towards the End of the *Summer*, ſome Farmers bought in freſh *Cattle* and turn'd them into the ſame Fields where many Cows had died before, that they took the *Infection* and died likewiſe: But the following *Spring*, thoſe Fields were void of Infection, and

the Cows that were put in did very well; but the Cows that were then put into the Cow-Houſes (where the Sick Cows had been the Year before) were ſeiz'd with the *Diſtemper* and died. Which ſeems to inform us, that it was the effect of *Inſects*, which thro' the Warmth of thoſe Stalls were preſerv'd from the Severity of the *Winter*'s-Froſt; but ſuch as were left in the Open Fields, were deſtroy'd by the Cold. I have heard that a Woman about *Camberwell* cur'd ſix in ſeven of her *Cows* by giving them once a Week an Infuſion of *Rue* and *Ale-wort*.

But it may be ask'd, Why theſe *Infectious Diſtempers*, ſubject to *Men*, *Cattle*, and *Plants*, are not Univerſal? And why the *Plague* ſhou'd not be as well in *India*, *China*, the South Parts of *Africa* and *America*, as in theſe Parts of the World? (For I do not know it has ever been in theſe Places). This Quære gives me a farther Opportunity to ſuggeſt, that *Inſects* are the Cauſe of it, and that they are brought with the *Eaſterly-Winds*. In the firſt place, ſo far as I can learn, there is not Naturally in *America* any one kind of

of *Creature* or *Inſect* that is found in any other Part of the World, and the *Plants* likewiſe are all different from thoſe of other Countries; as it is the ſame in *India*, *China*, &c. whoſe Products are quite different from what we find elſewhere. Suppoſing then that theſe Peſtiferous *Inſects* are only the Produce of *Tartary*, let us conſider to what Parts of the World they may be carried from thence with the *Eaſterly-Winds*; and whether *India*, *China*, the South of *Africa* and *America*, are not beyond their reach, or can reaſonably be affected by them.

Whoever conſiders the Diſpoſition of the Land and Water in the Globe, may thus account for the Paſſage of theſe *Inſects*, with an *Eaſterly-Wind* from *Tartary* to all the Parts of *Europe*, *Aſia-minor*, *Paleſtine*, *Barbary*, and other *South* Coaſts of the Mediterranean Sea, whither, 'tis highly probable, they may come, without meeting any thing in their way to obſtruct their Courſe.

The beſt Maps do not lay down any *Mountains* of Note between *Tartary* and the Places which have been ſubject to the

Plague. The *Alps* run parallel with the *Winds* coming from *Tartary*, and therefore do not any way hinder their Paſſage: The *Mountains* of *Dalmatia* are not high enough to prevent the Paſſage; or if they were, the *Caſpian* Sea is ſufficiently large to let them to the *South* Parts of *Europe*, the *Mediterranean* Sea, and the *North* Coaſts of *Africa*, even to their moſt *Weſtern* Bounds.

Now it may be expected perhaps by ſome, that theſe *Winds* ſhou'd yet continue their Progreſs as far as *America*; but, as yet, (ſo far as I can learn) theſe *Land-Winds*, when they have blown with the greateſt Force, and have been of the longeſt Continuance, have not reach'd farther than about 300 Leagues beyond the *Weſtern* Coaſts of *Europe*, which is a Trifle in compariſon of the Vaſt *Ocean* between Us and *America*. Beſides, 'tis my Opinion, that the *Winds* which blow over ſo vaſt a Tract of Land, as theſe *Tartarian* Winds muſt do, that I ſuppoſe convey and ſupport the Peſtiferous *Inſects*, are of ſo different a Nature from the *Winds* coming from the *Ocean*, that 'tis likely

thoſe

thoſe Creatures which wou'd ſubſiſt in the one, wou'd be deſtroy'd by the other. So that if I am right in this Conjecture, *America* cannot be ſubject to the *Plague*.

Mount Atlas (which is a vaſt Ridge of Mountains, running from the *Ocean* almoſt as far as *Ægypt*, and are back'd with the Deſarts of *Lybia*) may very likely obſtruct the Paſſage of theſe *Inſects* to the South of *Africa*; and for that Reaſon perhaps ſecure that Part of the World from *Plagues*. So likewiſe *Mount Caucaſus*, or *Ararat*, which is one of the higheſt Ridge of Mountains in the World, running from Eaſt to Weſt thro' *Perſia* and *India*, may ſecure the *South* Parts of thoſe Countries from the Plague, by ſtopping the Paſſage of thoſe *Infectious Creatures*, if any Winds from *Tartary* ſhou'd happen to blow them that Way. And as *China* lies to the Eaſt of *Tartary*, ſo it muſt be *Weſterly-Winds* which muſt infect that Country with the *Plague*, if it proceeds from what I imagine: But we do not yet find that *Weſterly-Winds* are frequent in thoſe Parts; or if they are, we may be aſſur'd they cannot blow at

the

the ſame time when the *Inſects* are hatch'd and carry'd the contrary Way by the *Wind* from *Tartary*. We are inform'd, that upon the Coaſt of *China* the Winds are ſo regular, that from *October* to *March* they continually blow from the *North-Eaſt*; and from that Month to *October*, the direct contrary Way.

I ſhall conclude with LUCRETIUS's Opinion concerning the Cauſe of the Plague, tranſlated by Mr. CREECH, p. 217.

NOW next I'll ſing what Cauſes PLAGUES *create,*
What drives a PESTILENCE, *ſwoln big with Fate,*
To waſte, and lay a Nation deſolate.

I've prov'd, that numerous Vital Parts do fill
The Air, ſo likewiſe numerous thoſe that kill:
Theſe Poiſons (whether from the threatning Skies
Like Clouds they fall, or from the Earth ariſe,
When She's grown Putrid by the Rains, or ſweats
Such noxious Vapours preſs'd by ſcorching Heats,)
Infect the Lower Air, and hence proceed
All raging PLAGUES, *theſe all Diſeaſes breed.*

Thus often when one Country's Air is blown
Into another, and forſakes its own;
It ſpoils the wholſome Air where e'er it goes,
And makes all like it ſelf unfit for Us:

Thence

Thence PLAGUES *ariſe, and theſe deſcend and paſs*
Into our Fountains, tender Corn, or Graſs,
Or other Food, or hang within the Air
Held up by fatal Wings, and threaten there;
So whilſt we think to Live and draw our Breath,
Thoſe Parts muſt enter in, and following Death:
Thus PLAGUES *do often ſeize the labouring Ox,*
And raging Rots deſtroy our tender Flocks.
And thus the Thing's the ſame, if Winds do bear
From other Countries an unuſual Air,
And fit to raiſe a PLAGUE, *and Fever here,*
Or if we travel all, and ſuck it there.

The Learned Dr. MEAD in his excellent *Diſcourſe concerning Peſtilential Contagion*, printed in 1720. ſays, That Contagion is propagated by three Cauſes, the *Air*, *Diſeaſed Perſons*, and *Goods* tranſported from infected Places. The *Plague* (ſays he) is a real Poiſon, which being bred in the Eaſtern or Southern Parts of the World, maintains it ſelf there by circulating from *Infected* Perſons to Goods; which is chiefly owing to the Negligence of the People in thoſe Countries, who are ſtupidly careleſs in this Affair: That when the Conſtitution of the Air happens to favour Infection, it rages there with great Violence: That at that Time more eſpecially

cially Diſeas'd Perſons give it to one another, and *Contagious Matter* is lodg'd in Goods of a looſe and ſoft Texture, which being pack'd up and carried into other Countries, let out, when open'd, the impriſon'd Seeds of Contagion: And laſtly, that the *Air* cannot diffuſe and ſpread theſe to any great Diſtance, if Intercourſe and Commerce with the Place infected be ſtrictly prevented.

F I N I S.

